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ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

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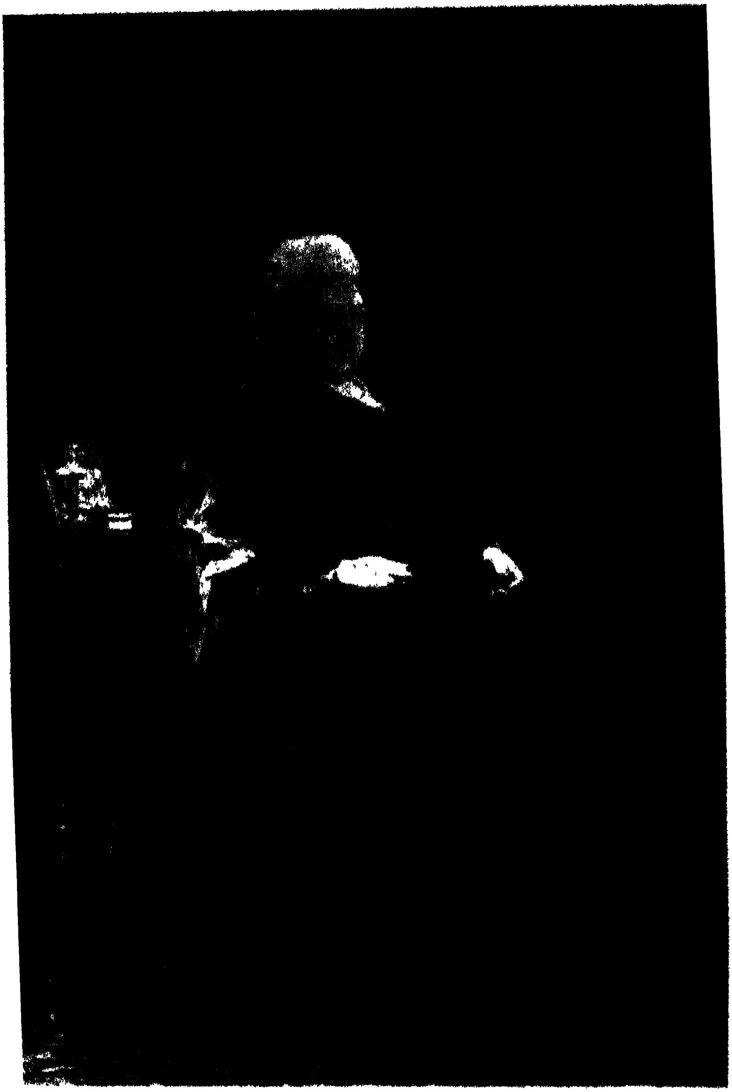

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THE

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OF THE

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(Dating from the Foundation of the Society) :—

"The Society will not be responsible for the accuracy of the statements or conclusions contained in the several papers in the Journal, the authors themselves being solely responsible."

TABLE OF CONTENTS.

VOLUME LXII., 1901.

PORTRAIT OF HER MAJESTY QUEEN VICTORIA. *Frontispiece*
PATRON OF THE SOCIETY FROM 1840 TO 1901.

[*Reproduced from the picture by* W. Q. ORCHARDSON, R.A., *of "The Four Generations," painted from personal sittings given by Her Majesty in* 1899.]

Special Articles.

PAGE

English Agriculture in the Reign of Queen Victoria 1
By ROWLAND E. PROTHERO, M.A., M.V.O.

Some Practical Hints on Cider-making 40
By R. NEVILLE GRENVILLE.

The Relationship between Human and Bovine Tuberculosis 50
By PROFESSOR J. MCFADYEAN, M.B., B.Sc., C.M.

The Education of the Young Farmer 58
By DOUGLAS A. GILCHRIST, B.Sc.

The Hop and its English Varieties (*With Twenty-two Illustrations*) . 67
By PROFESSOR JOHN PERCIVAL, M A., F.L.S., F.C.S.

Epizootic or Contagious Abortion 96
By PROFESSOR J. MCFADYEAN, M.B., B.Sc., C.M.

The Cardiff Meeting, 1901 113
(*With a Plan and Ten Illustrations*)
By THE ASSISTANT EDITOR.

The Trials of Portable Oil Engines at Cardiff 158
(*With Eighteen Illustrations*)
By PROFESSOR J. A. EWING, F.R.S.

The Trials of Ice-making Plant at Cardiff (*With Six Illustrations*) . 180
By PROFESSOR J. A. EWING, F.R.S.

Miscellaneous Implements exhibited at Cardiff 191
(*With Four Illustrations*)
By CHARLES P. HALL.

Official Reports.

PAGE

Report of the Council to the Anniversary General Meeting of Governors and Members, May 22, 1901 198

Report of the Council to the Half-Yearly General Meeting of Governors and Members, December 12, 1901 208

Annual Report for 1900 of the Principal of the Royal Veterinary College 215
By PROFESSOR J. MCFADYEAN, M B., B.Sc., C.M.

Annual Report for 1901 of the Consulting Chemist 229
By J. AUGUSTUS VOELCKER, M.A., B.Sc., PH.D.

Annual Report for 1901 of the Consulting Botanist 241
(*With Fifteen Illustrations*)
By WILLIAM CARRUTHERS, F.R.S.

Annual Report for 1901 of the Zoologist (*With Four Illustrations*) . 257
By CECIL WARBURTON, M.A.

The Woburn Field and Feeding Experiments 272
(*With Five Illustrations*)
I.—Field Experiments, 1899 and 1900 272
II.—Value of Condiments in the Feeding of Bullocks . . 299
III.—Early Feeding of Mangels to Sheep ; and Gorse as Food for Sheep 308
By J. AUGUSTUS VOELCKER, M.A., B.Sc., PH.D.

The Woburn Pot-Culture Experiments 317
(*With Fifteen Illustrations*)
I.—Pot-Culture Experiments of 1900 . . . 317
II.—Experiments in Weed Prevention 334
By J. AUGUSTUS VOELCKER, M.A., B.Sc., PH.D.

Report to the National Agricultural Examination Board on the Results of the Second Examination for the National Diploma in Agriculture 342

Notes, Communications, and Reviews.

Portrait of the late Sir Joseph Henry Gilbert . . . . *Opposite* 347
[*Reproduced from a painting by* FRANK O. SALISBURY.]

In Memoriam: Sir Joseph Henry Gilbert (1817-1901) 347
By J. AUGUSTUS VOELCKER, M.A., B.Sc., PH.D.

The Market Gardeners' Compensation Act, 1895 356
By S. B. L. DRUCE.

The Rating of Agricultural Land 361

PAGE
Preservatives and Colouring Matters in Food 365
Francis Duke of Bedford (1765–1802) 367
By Sir ERNEST CLARKE.
Statistics affecting British Agricultural Interests 373
The Weather during the Agricultural Year, 1900–1901 . . . 394
Rainfall, Temperature and Bright Sunshine during 1900 . . 402
The Rainfall of 1900 403

Appendix.

List of Council of Royal Agricultural Society of England . . i
Standing Committees of the Council iii
Chief Officials of the Society iv
Geographical Distribution of Members and Council . . . v
Governors of the Society vii
Honorary Members of the Society xi
Summary of Members on the Register, December 12, 1901 . . xi
Balance Sheet for 1900, with appended Statements of Ordinary Income and Expenditure, and of Receipts and Expenditure at the York Meeting, 1900 xii
Table showing the Number of Governors and Members in each Year from the Establishment of the Society xx
Proceedings of the Council in 1901. xxi
February 6, xxi; March 6, xxix; April 3, xxxiv; May 1, xlviii; June 5, lxi; July 31, lxxi; November 6, lxxx; December 11, lxxxv.
Proceedings at the Anniversary General Meeting, May 22, 1901 . lvi
Proceedings at the General Meeting, June 27, 1901 lxvii
Proceedings at the Half-Yearly General Meeting, December 12, 1901 xci
Donations to Permanent Show Fund xcvi
Officials and Judges at the Cardiff Meeting, 1901 ci
Awards of Prizes at Cardiff cv
Prizes offered in connection with the Carlisle Meeting, 1902 . . clxxviii
Papers set at Examinations of 1901 for the National Diplomas in Agriculture and Dairying clxxxiv
Principal Additions to the Library cxcvii
Index to Contents of Volume LXII. ccii

Re-Numbering of the Volumes of the Journal.

In view of the difficulties which have been experienced in giving effective references to previous Volumes of the Journal, owing to three Series of it having been issued, each with Volumes bearing the same number, it has been decided by the Council that, to avoid confusion, the Volumes of the Journal shall be re-numbered from the beginning. Thus the Volume issued in four Quarterly Parts during 1900 will in future be described as "Volume 61 (1900)," and the present bound Volume for 1901 will be described as "Volume 62 (1901)."

A Table showing the new numbers of each of the Volumes which have been issued since the first appearance of the Journal in 1839 is subjoined.

13 Hanover Square, London, W.
December, 1901.

ERNEST CLARKE,
Secretary.

TABLE SHOWING THE VOLUMES OF THE JOURNAL
(with the Old and New Numbers).

NEW NUMBERS	OLD NUMBERS	
	FIRST SERIES	
Vol. 1. (1839-40)	Vol. I.	Parts I. [i.], II. [ii.], III. [iii.], and IV. [iv.]
„ 2. (1841)	„ II.	„ I. [v.], II. [vi.], & III. [vii.]
„ 3. (1842)	„ III.	„ I. [viii.], II. [ix.], & III. [x.]
„ 4. (1843)	„ IV.	„ I. [xi.] and II. [xii.]
„ 5. (1844)	„ V.	„ I. [xiii.] and II. [xiv.]
„ 6. (1845)	„ VI.	„ I. [xv.] and II. [xvi.]
„ 7. (1846)	„ VII.	„ I. [xvii.] and II. [xviii.]
„ 8. (1847)	„ VIII.	„ I. [xix.] and II. [xx.]
„ 9. (1848)	„ IX.	„ I. (xxi.) and II. (xxii.)
„ 10. (1849)	„ X.	„ I. (xxiii.) and II. (xxiv.)
„ 11. (1850)	„ XI.	„ I. (xxv.) and II. (xxvi.)
„ 12. (1851)	„ XII.	„ I. (xxvii.) and II. (xxviii.)
„ 13. (1852)	„ XIII.	„ I. (xxix.) and II. (xxx.)
„ 14. (1853)	„ XIV.	„ I. (xxxi.) and II. (xxxii.)
„ 15. (1854)	„ XV.	„ I. (xxxiii.) and II. (xxxiv.)
„ 16. (1855)	„ XVI.	„ I. (xxxv.) and II. (xxxvi.)
„ 17. (1856)	„ XVII.	„ I. (xxxvii.) & II. (xxxviii.)
„ 18. (1857)	„ XVIII.	„ I. (xxxix.) and II. (xl.)
„ 19. (1858)	„ XIX.	„ I. (xli.) and II. (xlii.)
„ 20. (1859)	„ XX.	„ I. (xliii.) and II. (xliv.)
„ 21. (1860)	„ XXI.	„ I. (xlv.) and II. (xlvi.)
„ 22. (1861)	„ XXII.	„ I. (xlvii.) and II. (xlviii.)
„ 23. (1862)	„ XXIII.	„ I. and II. (xlix.)
„ 24. (1863)	„ XXIV.	„ I. (l.) and II. (li.)
„ 25. (1864)	„ XXV.	„ I. (lii.) and II. (liii.)
	SECOND SERIES	
Vol. 26. (1865)	Vol. I.	Parts I. (i.) and II. (ii.)
„ 27. (1866)	„ II.	„ I. (iii.) and II. (iv.)
„ 28. (1867)	„ III.	„ I. (v.) and II. (vi.)
„ 29. (1868)	„ IV.	„ I. (vii.) and II. (viii.)
„ 30. (1869)	„ V.	„ I. (ix.) and II. (x.)
„ 31. (1870)	„ VI.	„ I. (xi.) and II. (xii.)
„ 32. (1871)	„ VII.	„ I. (xiii.) and II. (xiv.)
„ 33. (1872)	„ VIII.	„ I. (xv.) and II. (xvi.)
„ 34. (1873)	„ IX.	„ I. (xvii.) and II. (xviii.)
„ 35. (1874)	„ X.	„ I. (xix.) and II. (xx.)
„ 36. (1875)	„ XI.	„ I. (xxi.) and II. (xxii.)
„ 37. (1876)	„ XII.	„ I. (xxiii.) and II. (xxiv.)
	SECOND SERIES—*continued*	
Vol. 38. (1877)	Vol. XIII.	Parts I. (xxv.) and II. (xxvi.)
„ 39. (1878)	„ XIV.	„ I. (xxvii.) and II. (xxviii.)
„ 40. (1879)	„ XV.	„ I. (xxix.) and II. (xxx.)
„ 41. (1880)	„ XVI.	„ I. (xxxi.) and II. (xxxii.)
„ 42. (1881)	„ XVII.	„ I. (xxxiii.) and II. (xxxiv.)
„ 43. (1882)	„ XVIII.	„ I. (xxxv.) and II. (xxxvi.)
„ 44. (1883)	„ XIX.	„ I. (xxxvii.) & II. (xxxviii.)
„ 45. (1884)	„ XX.	„ I. (xxxix.) and II. (xl.)
„ 46. (1885)	„ XXI.	„ I. (xli.) and II. (xlii.)
„ 47. (1886)	„ XXII.	„ I. (xliii.) and II. (xliv.)
„ 48. (1887)	„ XXIII.	„ I. (xlv.) and II. (xlvi.).
„ 49. (1888)	„ XXIV.	„ I. (xlvii.) and II. (xlviii.)
„ 50. (1889)	„ XXV.	„ I. (xlix.) and II. (l.)
	THIRD SERIES	
Vol. 51. (1890)	Vol. I.	Parts I. (1), II. (2), III. (3), and IV. (4)
„ 52. (1891)	„ II.	„ I. (5), II. (6), III. (7), and IV. (8)
„ 53. (1892)	„ III.	„ I. (9), II. (10), III. (11), and IV. (12)
„ 54. (1893)	„ IV.	„ I. (13), II. (14), III. (15), and IV. (16)
„ 55. (1894)	„ V.	„ I. (17), II. (18), III. (19), and IV. (20)
„ 56. (1895)	„ VI.	„ I. (21), II. (22), III. (23), and IV. (24)
„ 57. (1896)	„ VII.	„ I. (25), II. (26), III. (27), and IV. (28)
„ 58. (1897)	„ VIII.	„ I. (29), II. (30), III. (31), and IV. (32)
„ 59. (1898)	„ IX.	„ I. (33), II. (34), III. (35), and IV. (36)
„ 60. (1899)	„ X.	„ I. (37), II. (38), III. (39), and IV. (40)
„ 61. (1900)	„ XI.	„ I. (41), II. (42), III. (43), and IV. (44)
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JOURNAL

OF THE

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

ENGLISH AGRICULTURE IN THE REIGN OF QUEEN VICTORIA.

THE reign of Queen Victoria began on June 20, 1837; it ended on January 22, 1901. Between those dates, changes, so vast as to defy detailed enumeration, have passed over English agriculture. General views are alone possible, and yet, without fixed points of detailed comparison, generalities produce no effect. New practices, new implements, new methods, are so gradually adopted, and so soon become familiar, that previous conditions are forgotten. The magnitude of the changes can only be realised by contrast with agricultural life in 1837. Movements, of which men then saw only the beginning, or the immediate consequences, have now worked themselves out.

Looking back to 1837 from the vantage ground of 1901, we see that the reign began in a transition stage from one state of social and industrial development to another. A complete change of agricultural front was taking place, which demanded the displacement, if not the extinction, of classes that had previously lived by the cultivation of the soil. The close of the century suggests the question whether agriculturists are now passing through another transition stage which, like its predecessor, may effect another agricultural revolution and necessitate another social disorganisation.

The reign opened, as it has closed, with a period of agricultural distress. Roughly speaking, and with exceptions, especially that of 1849, which will be hereafter noted, the first thirty-seven years were years of advancing prosperity and progressive improvement—of rising rents and increasing profits, of an expanding area of corn cultivation, of better-bred, better-fed, better-housed, and multiplied stock, of growing expenditure on drainage, farm buildings, and machinery. So far as production is concerned, apart from its processes, agriculture has made but little advance since the "Fifties." The last twenty-six years of the reign, on the other hand, have been a period of agricultural adversity—of falling rents, dwindling profits, contracting areas of arable cultivation, diminishing stock, decreasing expenditure on land improvement.

Of the three classes most directly interested in farming, labourers alone, as a class, hold a better position in 1901 than they occupied in 1837 or 1874. Landlords and farmers have had to cut their coats to their cloth. For them, though individuals have here and there thriven, agricultural prosperity, as it was understood in 1804–15 or 1853–74, exists only in the dictionary.

More than half the arable land of England and Wales was in 1794 cultivated on the unfenced, open-field, common-farm system. In Scotland the same system prevailed extensively, if not generally. But the common farm, though it still existed when the Duke of Richmond's Commission issued its Report in 1882, has so completely disappeared that its main features are forgotten. Long straggling rows of mud-built cottages, such as Scott describes at Tully-Veolan, housed the agricultural partners who farmed the land as a common venture, and gathered in villages which were isolated and practically self-supporting. Away from the main arteries of communication, roads hardly existed "Miry and foundrous" drift-lanes, leading from the cottages to the cultivated land, and ceasing at its bounds, could only be called highways by an improbable courtesy. Cut off from the outside world, the inhabitants had little need to communicate with their neighbours. The rude implements of production or the rough utensils of household needs were fashioned at home. The fields, the live stock, and the wastes provided food and clothing, timber and fuel, baskets, ropes and candles. Few villages were too small to support a smith and a carpenter, or too remote for the visits of the tinker and the pedlar.

The lands of the village were divided into meadow, arable, and pasture. The meadows, annually allotted and fenced off in strips from Lady Day to harvest, were for the rest of the year open common pasturage. The three great arable fields, bare and hedgeless, were tilled and cropped in an unvarying triennial succession. Every year one field was sown with wheat or rye; the second with barley, oats, beans or pease; the third lay fallow. Each of the fields was split up into acre or half-acre strips divided from each other by narrow bush-grown balks of unploughed turf. The holdings were so distributed that each partner had a third of his holding in each of the three fields, and the bundles of strips were so intermixed that the good and bad land was evenly divided. From seed-time to harvest the strips were the property of individuals. As soon as the crops were cleared, common rights revived, and the live-stock of the village wandered over the whole. Beyond the meadows and the tillage lay the poorest and roughest land, on which the common herdsman and shepherd depastured the cattle and sheep of the community. In the late summer the live-stock were turned in upon the aftermath of the meadows, the haulms of the beans or pease, and the stubble of the corn crops. It was only at this season that either sheep or oxen were more than skin and bone, and hence the advice given by Tusser: "For Easter at Martylmas hang up a beef."

Under such a system no individual improver could move hand or foot. Unless the whole body of partners agreed together, no winter crops could be grown, and drainage was impossible; the improvement of live stock was wasted labour, when the half-starved diseased cattle and sheep of the village were crowded together on the same commons. Modifications of the system doubtless existed; but in its general outline the picture is a true one. It is difficult for the present generation to realise its paralysing influence on British farming. The stock descriptions of contemporary writers are probably familiar to readers of the Journal. But the following account is a less well-known yet equally accurate picture of the effect of open-field farms. It makes little difference that the state of things described belongs to an earlier period, for the essence of the system was that it was incapable of change.

Sir Archibald Grant, of Monymusk, in Aberdeenshire,[1] writing shortly after the Union between England and Scotland, says that turnips grown in enclosed fields by the Earl of Rothes and a few others, were an object of wonder, and that wheat was confined to East Lothian. In 1716 he was allowed by his father to manage part of the family estate. "At that time there was not upon the whole estate one single acre enclosed, nor any timber upon it but a few elm, sycamore, and ash about a small kitchen-garden adjoining to the house, and some straggling trees at some of the farmyards with a small copse-wood not enclosed, and dwarfish, and browsed by sheep and cattle. All the farms ill-disposed and mixed; different persons having alternate ridges; not one wheeled carriage on the estate, nor indeed any one road that would allow it. . . . The whole land raised and uneven, and full of stones, many of them very large, of a hard iron quality, and all the ridges crooked in shape of an S, and very high and full of noxious weeds, and poor, being worn out by culture without proper manure or tillage. The people poor, ignorant, and slothful, and ingrained enemies to planting, enclosing, or any improvement or cleanness; no keeping of sheep, or cattle, or roads, but for four months when oats and beans, which were the only sorts of their grain, was on the ground."

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[1] *Miscellany of the Spalding Club.* Aberdeen: 1841-2.

The effect of the Revolutionary and Napoleonic Wars, and, directly or indirectly, of industrial development, was to extinguish the open-field farm as the prevailing system of land-cultivation. With the open-field farmers passed away multitudes of small landowners, yeomen, and commoners, who were tempted to sell their land by extravagant prices, or to exchange their common rights for temporary riches. Enclosure went on apace, and in the last thirty years of the reign of George III. it is calculated that 3¼ million acres were enclosed. Estates were consolidated and farms enlarged. "Since 1760," says the author of "A Plan for Relieving the Rates by Cottage Acres" (London: 1816), "upwards of forty thousand small farms" were thrown into larger holdings, and "as many cottages annihilated."

Napoleon had been the Triptolemus or patron saint of British farmers. In 1815 he was a prisoner at St. Helena. The war was over and its prices had departed. Peace had come at last, but with beggary, not plenty, in her train. War profits disappeared; war taxes remained. Landlords who had mortgaged their properties to acquire some Naboth's vineyard at fancy prices, or charged their estates with annuities or portions commensurate with their inflated incomes, found themselves confronted by ruin. Tenants, farming on borrowed capital, were sold up. Men of substance held out longer. Violent fluctuations of prices, hopes of increased Protection, the operation of the "sliding scale" encouraged them to pay extravagant rents out of their capital in the hope of returning prosperity. But, as the distress grew more and more acute, they found themselves beggared. In February, 1816, the Board of Agriculture sent a circular letter throughout the counties, seeking to ascertain the condition of agriculturists. Some allowance must, of course, be made for men in hope of relief making the worst of their case. But enough remains to prove the depths and reality of the distress. The answers show that rents were reduced 25 per cent., or remitted altogether; that arrears were cancelled; that land continued to be abandoned on every side. Improvements stopped, live-stock diminished, and "everywhere bankruptcies, seizures, executions, imprisonments, and farmers became parish paupers." "Some of the best estates of the kingdom," says Richard Preston, M.P.[1] "were selling at a depreciation of 50 per cent.; one of the finest grass farms in Somersetshire sold lately at ten years' purchase."

Evidence given before a Select Committee in 1821 shows that in Sussex, for instance, rents were reduced 53 per cent., and that in Dorsetshire fifty-two farmers, farming between them 24,000 acres, failed between 1815 and 1820. Labour difficulties, agrarian outrages, the ravages of the rot, bad seasons, disturbances of the currency, bank failures, accumulated misfortunes on the heads of agriculturists. The tables of the House of Commons groaned with petitions for remunerative prices. Select Committees sat almost continuously from 1820 to 1836, inquiring into the causes of agricultural misfortunes. The last of these Commissions made no report, and the impression created by the evidence is that in 1836 the distress was subsiding, and that clay farmers were then its worst, if not its only remaining victims.

The results of these disastrous years were the depressed conditions under which the reign of Queen Victoria opened. In times of adversity it has always been the practice to charge farmers with extravagance, to trace distress to their increased luxury, to attribute their domestic difficulties to their less simple habits. During the last twenty-five years much has been heard of an explanation which is as old as the hills. Arthur Young, writing in 1773 "On the Present State of Waste Lands," remarks that the landed gentry were beggared by their efforts to rival their wealthier neighbours who had amassed fortunes in trade. The rural frog bursts in his efforts to equal the proportions of the Civic ox. "The antient prospect which afforded pleasure to twenty generations is poisoned by the pagodas and temples of some rival neighbour; some oilman who builds on the solid foundations of pickles and herrings. At church the liveries of a tobacconist carry all the admiration of the village; and how can the daughters of the antient but decayed gentlemen stand the competition at the assembly with the paint, diamonds, and tissues of the haberdasher's niece?"

In 1651 Walter Blith had attributed the rural depression of that day to the "high stomachs" of the farmers. So in 1816 the wiseacres of the London clubs vehemently contended that farmers had only to return from claret to beer, and their wives from the piano to the hen-house, and agricultural depression would be at an end. The same cry was raised against labourers "We hear," writes Borlase, the Cornish antiquary, in 1771, "every day of murmurs of the common people; of want of employ; of short wages; of dear provisions. There may be some reason for this; our taxes are heavy upon the necessaries of life; but the chief reason is the extravagance of the vulgar in the *unnecessaries of life*." Among the tinworkers in his parish were "three-score snuff-boxes at one time; of fifty girls above fifteen years old, forty-nine have scarlet cloaks." "There is scarce a family in the parish, I mean of common labourers, but have *tea*, once if not twice a day . . . In short, all labourers live above their conditions."

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[1] *On the State of the Nation.* London: 1816.

The same explanations with regard to all classes of agriculturists were repeated in 1816–36. The diagnosis of disease would not be so popular if it were not easy and to some extent true. But it is, to say the least, inadequate. Men had spent money more lavishly than the prudence which criticises after the event could justify. But the true explanation of the distress lies in the agricultural revolution, which was none the less complete in its operation because it was peaceful in its processes.

Agriculture languished in 1837; farming had retrograded. Heavy clay lands were to some extent abandoned; all were foul and in a miserable state of cultivation. Sheep walks and pasture, when first ploughed, had produced good crops from the accumulated mass of vegetable matter which they contained. But this fertility was soon exhausted by a barbarous system of cropping. At peace-prices half-crops ceased to be remunerative, and the newly ploughed arable area was recovering itself from exhaustion to pasture as best it could without assistance. Light soils had suffered comparatively little: turnips and the four-course system had helped the eastern counties to bear the stress of the storm, though Norfolk farmers had "had to put down their chaises and their nags." But one of the worst features was the prevailing distrust. Farmers who had contracted to pay war rents from peace profits were shy of leases. For at least a generation confidence was shaken between landlord and tenant.

The brighter side to the picture is that, by means of much suffering, the ground was prepared for changed conditions. Small landed proprietors, yeomen, commoners, open-field farmers could never have fed a manufacturing population.

From these classes the most bigoted opponents of "Practice with Science" were recruited, and their contempt was heartily sincere for the innovations of "book" or "apron-string" farmers. Socially valuable though they were, these classes were becoming commercially worthless. "Turnip" Townshend had been dead for a century; but to farmers of the ancient type root-crops and the four-course system had not penetrated even in 1837. Jethro Tull died at a still earlier date: yet the use of either a drill or a horse-hoe would have puzzled them little less than an electric battery. In spite of Bakewell, their ideals of stock continued to be the unthrifty, misshapen oxen which they esteemed for their power of draught, or leggy sheep that they valued principally for their wool. Their ploughs, the work of village wheelwrights and hedge-carpenters, were so heavy and cumbrous that they required teams of six horses or even of twelve oxen, and the attendance of two men and a boy; but though enterprising neighbours with better instruments might do the same work in less time and at half the cost, they clung to the ancient implements as agricultural heirlooms. Among a number of ignorant, suspicious co-proprietors, on an open-field farm, no agreement was possible; but without agreement it was wasted energy to attempt to introduce rotations of crops, improve live-stock, drain the land, or reclaim the wastes.

The removal of these classes was a social evil but an economic necessity. No inducement to develop the natural wealth of the country had existed so long as there was no accessible market beyond the immediate wants of village life. But all this was changed when, as though under the wand of the enchanter, vast and crowded haunts of labour and trade sprang up throughout the country. The land could no longer be cultivated for the needs of a scattered scanty population, occupied in the tillage of the soil, or engaged in one-man handicrafts. Like spinning and weaving, it was necessary that farming should be transformed from a self-sufficing domestic industry into a profit-earning manufactory of bread, beef, and mutton. Food upon the scale which changed conditions demanded could only be produced by capitalist landlords, large tenant-farmers, and wage-earning labourers.

In other respects also, the distress of 1816–37 produced good results. So long as war prices prevailed, prosperous years brought wealth to slovens, and sluggards amassed riches in their sleep. The collapse of prosperity spurred the energies and enterprise of farmers, who could only hold their own by economising the cost and increasing the amount of production.

Again, though the attraction of war prices had driven the plough through much valuable pasture, it had also supplied the incentive which added hundreds of thousands of acres of wastes and commons to the cultivable area of the country. Finally, farmers had learned to rely too entirely upon Parliamentary help in their difficulties. An alteration in the protective duties was enough to turn the balance between the success and failure of their harvests. Now, disappointment after disappointment had taught them the useful lesson that they could expect no immediate assistance from legislative interference, and that, if they wanted aid, they must help themselves.

Meanwhile legislation had not been idle. The agricultural revolution, and the effects alike of war and peace, had completely disorganised the labour market. Parliament co-operated with industrial changes in redressing the balance between demand and supply and adapting the relations of capital and labour to new conditions. For agricultural labourers the Poor-law of 1834 did what the Factory legislation of 1833 had done for artisans. Open-field farmers, reduced to wage-earning labourers, had not yet accepted their altered conditions. Commoners had lost their commons; the handicrafts which had supplemented wages were transferred to manufacturing towns. Population was shifting from the South to the North.

During the war, while agricultural wages remained stationary or decreased, prices of all necessaries rose rapidly. After the peace of 1815, thousands of soldiers, sailors, and militiamen swelled the ranks of the unemployed. So far from reducing the disorganisation, the system of poor-relief, adopted during the first thirty years of the century, only confounded confusion. Weekly earnings were supplemented from the rates, and the parish guaranteed "a living wage." The payment was increased in proportion to the number of children. The larger the family, the greater the relief. Administered, often in their own interests, by farmers or shopkeepers, relief was voted to save the labour bill or increase custom. Ratepayers, burdened by the increasing load of poor-relief, spent less and less on wages, till half the agricultural labourers were paupers. The system annihilated all distinctions between good and bad workmen, directly encouraged improvident marriages, and put a premium on the procreation of children. In 1834 came the new Poor-law. Parishes were grouped in unions; Boards of Guardians administered relief for whole unions; outdoor relief to able-bodied labourers was discouraged. The change produced immediate effect. The number of paupers steadily diminished, and the poor-rates fell from seven millions in 1832 to four millions in 1837.

Another important result of the prolonged agricultural distress was the Tithe Commutation Act of 1836. The form in which tithe was paid varied in almost every parish, and was determined by usage and custom. But in almost every form in which the produce was tithed, the value of the tithe fluctuated with the amount of the crops raised from the land. Some uniform and permanent system of money payment was urgently needed. Men would not embark their money or their labour in extensive schemes of improvement when tithe-owners, paying nothing and risking nothing, shared in the profits. If tithe was taken in kind, the hay and straw were removed off the farm, and the land was proportionately impoverished by the loss of the manure, for which chemistry had as yet provided no alternative. It was, moreover, a wasteful system. The value of the tithe in kind was probably greater by a third to the farmer than it was to tithe-owners, who had their capital invested in teams, carts, barns, and implements, and had to pay the expenses of collecting, threshing, and carrying to market. In exceptionally favourable circumstances, parsons did not receive more than two-thirds of the value of the tithe in kind. The delays which the system imposed were also a frequent cause of loss. In rainy weather when rapid harvesting was necessary, farmers were obliged to shock or cock their crops, give tithe-owners notice to set out their tithes, and wait a reasonable time for their arrival. Meanwhile, the rain outstripped the slow-paced tithing man, and the crops were damaged. Sometimes, indeed, the growing animosity towards the payment took ludicrous forms. In Hampshire, a farmer was on bad terms with his rector because the latter insisted on taking his tithe in kind. One autumn the farmer gave notice that he intended to draw a field of turnips. The parson's team and servants attended on the appointed day; the farmer drew ten turnips, and desired the tithing-man to take one, saying that he did not intend to draw any more that day, but would let him know when he did.

As agricultural distress increased, a formidable agitation against the payment of tithe was set on foot. To remove the grievance, several schemes were proposed before 1836. Thus, in 1833, Lord Althorp proposed, as the basis of commutation, the actual amount of tithes which had been paid in each parish during the last seven years. The plan was rejected on the ground that it placed a premium on the rigorous exaction of legal rights. In 1834 he proposed to strike an average of the tithe in kind, estimate the value in money, throw the payment on owners instead of occupiers, and give it a fixed proportion to the rent of the land out of which it issued. But the scheme was negatived on the ground that rent and tithe were not common measures of value. In 1833, Sir Robert Peel announced his intention of introducing a Tithe Bill. He adopted the principle of encouraging voluntary commutation, and, with this object, proposed to commute the tithe for a fixed payment in the shape of a corn rent varying with the price of corn. Before Peel could bring in his Bill, his Government resigned on the Irish Church Appropriation question. Finally, in 1836, Lord John Russell introduced his Bill. Both parties, after the principle of compulsion had been carried, loyally co-operated to make the measure effective. The Bill was carried, and the principle under which the payment of tithes is now regulated put into force. It is worthy of notice that Lord Althorp in 1833 and Sir Robert Peel in 1835 agreed that tithe commutation was a necessary preliminary, but a preliminary only, to a final measure of redemption. On another point they were equally unanimous. Lord Althorp in 1833, Sir Robert Peel in 1835, and Lord John Russell in 1836 were agreed that the payment of the tithe should be transferred from occupiers to owners of land.

It was with the ground thus prepared, but in gloom and depression, that farmers entered upon the new reign. Few persons in 1837 could have foreseen that social and industrial changes were close at hand which would introduce to British farming an unexampled era of prosperity, or could have foretold that new markets would not only be opened up, but brought to the doors of agriculturists. Signs of better times were, indeed, faintly visible. Manufacturing progress was beginning to tell upon agriculture; railroads, steam navigation, joint-stock banks, helped farmers to face their difficulties; the new system of poor-law administration had already reduced the rates; beef, mutton, and wool rose in price; barley and oats sold briskly; popular tumults at Birmingham, Sheffield, and Newport (Mon.) were partly caused by a general rise in the prices of food, by which farmers were profited.

In comparing agriculture in 1837 with that of 1901, the most striking feature is the general level of excellence which now prevails. If we leave on one side the achievements of chemical science and the triumphs of mechanical invention, there are few improvements in the methods and practices of agriculture which had not been anticipated by individuals a century ago. But the knowledge which was then, at the most, confined to one or two men in a county is now generally practised. The best farmers of that day could not have explained the reasons for their methods; they farmed by experience and intuition. Judgment is still all-important; but practice has now been reduced to principles and rules, so that the best methods are more nearly the property, or at least are within the reach, of all. Grass-lands had already received considerable attention. Stillingfleet in 1760 had distinguished by excellent illustrations between the different varieties of good and bad pasture. The Society of Arts, Manufactures and Commerce, which was the predecessor of the Board of Agriculture, had offered premiums for the best collections of the best kinds. The Lawsons in Edinburgh, and landlords like Mr. Coke of Holkham, were experimenting on grasses or putting into practice on their estates the lessons of botany. John Duke of Bedford, in his *Hortus gramineus Woburnensis* (1824) had already published the results of Sinclair's experiments in grasses. Model arable farms in 1837 were cropped much as they are now, except that the rotations were more rigid and inelastic, that less attention was paid to mangel-wurzels, and that less care was bestowed on utilising the interval between the August corn crop and the June sowing of turnips. Pedigree barleys and pedigree wheats were already experimented upon by Dr. Chevallier and Colonel Le Couteur respectively. By the most enterprising of our predecessors all the farm crops which are grown to-day were grown then. Nor was the yield always inferior. Corn crops were lighter then than now. In the best agricultural counties—Essex and Suffolk—the yield of wheat averaged 24½ bushels and 22 bushels respectively per acre. On this average the 26½ bushels of 1850 is a striking improvement, especially when it is considered the average quality of wheat-land was higher in 1837 than at the later period. But the yield of potatoes, on the other hand, was relatively much greater then than at the later period. A crop averaging 22 tons per acre, without any artificial fertiliser, would make even fenland farmers green with envy.

Live-stock has doubtless immensely improved since 1837. Specialisation did away with "general utility" animals, and successfully developed symmetry, quality, early maturity, or yield of milk among cattle. But the value and importance of improving breeds of live-stock were thoroughly appreciated by the best farmers in 1837. Only one herd-book—Coates's "Shorthorn Herd-book" (1822)—had begun to appear. But the principles of Bakewell of Dishley had already revolutionised the stock-breeder's art, and the foundation of the Smithfield

Club in 1798 powerfully accelerated improvement. Bakewell himself applied his principles to the improvement of cattle, sheep, pigs, and horses. But he made his permanent mark only with his flock of "New Leicesters." The Longhorns, on which, as is well known, his labours as a cattle-breeder were spent, have ceased to be fashionable, mainly because of their slowness to ripen. Yet he pointed the way, and it was by following his lead that other breeders succeeded with better material. Many monuments have been reared in Westminster Abbey to the memory of men who have benefited the nation infinitely less than this Leicestershire farmer.

It was through Bakewell's example that the brothers Colling, Bates, and the Booths, with the Shorthorns—Tomkins and the Prices with the Herefords—Francis Quartly and his nephews, the Davy family, and Mr. Coke of Holkham with the Devons—Hugh Watson of Keillor, followed by McCombie of Tillyfour, with the Aberdeen-Anguses, had already brought to a high degree of perfection the breeds with which their names are respectively associated.

Flockmasters had made similar progress. Like cattle-breeders, they had recognised the coming changes. As oxen were to be valued more for beef than power of draught, so sheep would repay their keep better by their mutton than their fleece. The Lord Chancellor might continue to sit on the woolsack; but farmers were to find more profitable saddles elsewhere. Bakewell's new Leicesters were the forerunners of improvement, because they not only had good fleeces but made good mutton. Before 1837 his methods had been imitated by others. The Border Leicesters of the Culleys and Robert Thompson, the Southdowns of Ellman of Glynde and Jonas Webb of Babraham, the Black-faces of David Dun, the Cheviots of Robson of Belford were already firmly established; and some of the best of the local varieties of sheep, enumerated by Sir John Sinclair in his "Report to the British Wool Society" (1792), were beginning to find their champions.

Pigs were no longer neglected. The reproach which, at the close of the eighteenth century, Arthur Young had directed against farmers was in process of removal. Here, again, Bakewell had led the way. Efforts were being made to improve such native breeds as the Yorkshire Whites, the Berkshires, or the breeds of Essex and Suffolk. But the aim of pig-breeders in 1837 was to obtain a fatter animal by crossing with the Chinese pig.

Oxen had been so extensively used for farm work that it is not, perhaps, surprising that comparatively little attention was as yet paid to horses for agricultural purposes. But here, too, some progress had been made, particularly from the point of view of specialisation. Two breeds of horses, both mentioned by their present names in the sixteenth century, were praised by Arthur Young. The "Sorrel-coloured Suffolk Punch" is said to have originated in a cross between the Percheron of Normandy and a Suffolk cart-mare. Beauty was not his strong point. But he was the hunting man's mount at the time when Suffolk was a pasture county. Unrivalled in his power of draught, able to throw his whole weight into the collar, he was also valued as a carriage-horse in days when important highways could only be called roads by a "vile prostitution of language." But with improved means of communication, the Suffolk Punch became unfitted, as Sir John Cullum wrote in 1790, to "indulge the rapid impatience of a posting generation." It was pre-eminently as a horse for farm work that the Suffolk Punch was recognised in 1837. The other breed, mentioned alike by Young and in an Act of Parliament of the reign of Henry VIII., was the "Large Black Old English Cart-horse," which Young calls "the produce principally of the *Shire* counties in the heart of England." The breed was, to some extent, experimented upon by Bakewell; but its development belongs to a later date than the first half of the Victorian era.

As with the Suffolk Punch, so with the Shire, the principle of specialisation was pre-eminently useful. In former days the Shire was the weight-carrier of knights in armour, and in this capacity came under the notice of Parliament. When armour fell into disrepute, the war-horse became the draught-horse, and as such the Shire has been, since 1877, patronised by Societies and enrolled in stud-books. Other local breeds doubtless existed, such as the Vardys of Northumberland or the Pack-horse of Devon. Clydesdales were beginning to make their way out of Lanarkshire, and Cleveland Bays were extensively used for farm work in some parts of the North of England.

It has been said that in 1837 agricultural distress was mainly confined to clay farmers, and that while the general standard of farming was still extremely low, the best practice of individual farmers of that day has been little improved by the progress of sixty years. Production has been considerably increased; but the higher averages were due to the wider diffusion of the best practices rather than to any notable novelties, and it is in live-stock that real advance is most clearly marked. If, however, we turn from the highest practice of farming to the general conditions under which it was carried on, or to the processes by which crops were cultivated, harvested, and marketed, the contrast between 1837 and 1874 is almost startling.

Tenancies at will or tenancies for lives were the ordinary conditions under which land was cultivated in 1837. The open-field system still prevailed extensively. Holdings were small, though in some parts of the country farms had been consolidated. Farm-buildings, often placed at the extreme end of the holding, consisted of large barns for threshing and storing corn, a stable and yard for cart-horses, a shed for carts and waggons. But the cattle, worse housed than the waggons, were huddled into draughty, rickety, unspouted sheds, erected without plan, ranged round a yard whence the liquid manure ran first into a horse-pond, and thence escaped into the nearest ditch. In these sheds the live-stock subsisted during the winter months on starvation allowance. Fat cattle, instead of being conveyed by rail quickly and cheaply, were driven to distant markets, losing weight every yard of the way. Long legs were a consideration for sheep which had to plough through miry lanes. There were few farm roads. Enclosures were small, and hedges large and straggling. Very little land was drained, and, except in Suffolk and Essex, scarcely any effort had been made to carry off the surface-water from clay soils.

Little or no machinery was employed in any operation of tillage. In remote parts of the country, even on light soils and for summer work, heavy ploughs, slowly drawn by teams of five horses or six oxen, attended by troops of men and boys, still lumbered on their laborious way, following the sinuous shape of boundary fences, or throwing up ridges crooked like an inverted S, in order to give the teams room to turn at the headlands, and laid wide and high by successive ploughing towards the crown, so as to get rid of the surface water before the use of under-draining was understood.

In more advanced districts, less cumbrous and more effective implements, wheel or swing, of lighter draught, were extensively employed. Ingenious men, like Ducket of Petersham (1770), had invented a multiple plough, and double-furrow ploughs were not uncommon before the end of the eighteenth century, though such implements were as yet too heavy for practical use. But not a few discoveries of real value fell into disuse, or failed to find honour in the land of their birth, till they returned to this country as American innovations. The mistake was too often made of exaggerating the universal value of a new implement in the modern style of the vendors of patent medicines. Enthusiasts forgot that provincial customs were generally founded on common-sense, and that farmers reason from instances within their experience.

The boast that a two-horse plough, with reins and one man, could, on all soils and at all seasons, do the work of the heavy implement dear to the locality only made the ancient heirloom more precious in the eye of its owner. It was with these antiquated implements, or with better but still costly instruments, like the turn-wrest plough of Kent, that practically the whole work of cultivating the soil was carried on. Harrows were generally primitive in form and ineffective in operation, scarcely penetrating the ground and powerless to stir the weeds. But Finlayson's harrow and Biddle's scarifier were already introduced. To keep the seed-bed firm against the loosening effects of frost, the only roller was a stone or the trunk of a tree heavily weighted. Modern implements, with the choice of smooth cylinders or serrated or smooth-edged discs, were unknown.

When the bed was prepared for the crop, the seed was either sown broadcast by hand, dibbled, or more rarely drilled. The dibbler, with an iron dibber in each hand, walked backwards, making the holes. Children, not yet banished from the fields by School Boards, dropped the seed into the holes, three children being the allowance for each dibbler, and the cost per acre being from 5*s.* to 8*s.* The Northumberland drill for turnips, and the Suffolk drill for cereals, which travelled every year on hire as far as Oxfordshire, had already attained something more than local popularity. But corn at this time was rarely either drilled or dibbled. The art of "setting corn," according to an Elizabethan writer, originated in the blunder of a "silly wench," who accidentally dropped corn into holes intended for carrots or radishes. The disgrace of its origin or the carelessness of children, perhaps, affected the prevalence of the practice, for in 1837 its advantages were hotly denied. The bush-harrow was the hawthorn tree recommended by Gervase Markham. From the time the seed was sown and harrowed in, the infant crops waged an internecine strife with weeds. Even the hand-hoe rarely helped cereals in the struggle, for the cost was heavy, and the work, unless carefully supervised, was easily scamped. In the North of England the price per acre for hand-hoeing was 3*s.* 6*d.*, and the work was done by a man and a child, or by women. Before 1837 the horse-hoe was seldom used, for even turnips were still sown broadcast; turnip thinners and the practice of spraying were alike unknown.

In 1837, hand-labour alone gathered the crops. It is in harvesting, preparing, and forwarding crops to market that mechanical invention has proved most successful. Corn was cut by scythes, fagging-hooks, or sickles; if with the first, each scytheman was followed by a gatherer and a binder; a stooker and raker completed the party. When a good man headed the gang, with four men to each scytheman, two acres a day per scythe were easily completed. So also with hay. Hay was mown with the scythe, and, in all its stages, made by hand, five haymakers being the ordinary allowance to each mower. The farmer of 1837 had a reaper at his command, but he did not value the gift. Its sudden popularity illustrates a point which is perpetually recurring in the history of agricultural machinery. As soon as the want is created the machine is not only discovered but appreciated. The principle of a reaper of the "header" type was known to the ancients. Pliny speaks of one in Gaul which cut the ears of corn and threw them into a tray. Its introduction was recommended by Palladius, whose treatise "De Agricultura" was dear to monastic libraries. But Barnaby Googe, in his "Whole Art of Husbandry" (1578), gives a sound reason against its adoption—a reason which held good at least till 1837. "Palladius teacheth," he says, "besides the labour of men, a shorter way to be done with an oxe, that shall in a short time cut down all that groweth, which was woont to be used in Fraunce. The devise was a low kind of carre with a couple of wheeles, and the front armed with sharpe sickles which, forced by the beast through the corne, did cut down all before it. This tricke might be used in levell and champion (enclosed) countries; but with us it would make but ill-favoured worke."

Many attempts were made to perfect a reaper, but none met with any real success till fields were enlarged, till thorough drainage was adopted, and, as a consequence, the old high-ridging system abandoned. It is a sign, and a consequence, of changes in farming that the Rev. Patrick Bell's reaper, invented in 1826, was not really appreciated till it was brought out in 1853 as Crosskill's "Beverley Reaper." The corn was still for the most part threshed by the flail, though threshing and winnowing machines on large farms in many parts of the country were worked by horse, water, and steam power. For feeding stock, chaff-cutters and turnip-slicers were already known; but they made their way slowly into use. Chaff was still generally cut, and turnips split, by a chopper. If cattle or sheep were too young to bite, they ran the risk of being starved. Pulping or steaming machines were unknown, and cake was too little used to require a crusher.

No one who studies the agriculture of 1837 can fail to notice the perpetual contrast, often in the most glaring form, between the practices of adjoining agriculturists. A hundred farmers plodded along the Elizabethan road, while a solitary neighbour marched in the track of the twentieth century. Discoveries in scientific farming, put forward as novelties, were repeatedly found to be in practice in one district or another. The great need was the existence of some agency which would raise the general level of farming by making the best practices of the best agriculturists common knowledge. The problem was not readily solved. To diffuse scientific and practical information among agriculturists is no easy task. It was even more difficult sixty years ago.

The prejudices which practical farmers entertained against the theories of literary agriculturists were neither unnatural nor unfounded. Books were expensive, and those for whom they were written were generally unable to read. Few of the agricultural works published before the reign of Victoria were produced by men of practical experience. Extravagant promises worthy of quack doctors, or science as incorrect as that of Katerfelto, too often discounted the value of useful suggestions. Moreover, the writers themselves were generally ruined at the plough before they took up the pen. Jethro Tull, instead of gaining an estate, lost two by his horse-hoeing husbandry; while Donaldson, the first important writer on Scottish agriculture (1697), had abandoned farming because he could not make it pay. Arthur Young had thrice failed in farm management before he began his invaluable tours. What was really wanted was ocular demonstration of the superiority of new methods, or the example of men of authority who combined scientific with practical knowledge. The Bath and West of England Society (1777), the Highland Society (1785), and other more local associations were at work in communicating the results of experiments, organising shows, and encouraging discoveries. The Smithfield Club (1798) already offered examples of the improvements in stock-breeding. The Board of Agriculture, founded in 1793, had also done some useful work before its dissolution in 1822. If it made no other claim to the gratitude of farmers, agriculturists would owe the Board a heavy debt for Davy's lectures on agricultural chemistry in 1803–13.

The dissolution of the Board of Agriculture had been one of the symptoms of agricultural distress. The foundation of the Royal Agricultural Society of England, projected in 1837, established in 1838, and incorporated by Royal Charter in 1840, with Queen Victoria as Patron, was at once a sign of revival and a powerful agent in restoring prosperity. Among the founders of the Society were many of the best-known landowners and most practical agriculturists of the day. Their association in a common cause carried weight and authority throughout the whole country. Their recognition of their territorial duties and enthusiasm for the general advancement of agriculture were communicated to others, and commanded success by their sincerity. The Society met a recognised want in the right way. It proclaimed the alliance between the farmer and the man of science; it indicated the directions in which agriculture was destined to advance. The wise exclusion of politics, though for a moment it threatened to endanger the existence of the new institution, eventually secured it the support of men of every shade of political opinion. By the comprehensiveness, elasticity, and foresight, with which its lines of development were traced, it has been enabled to meet the varying needs of sixty years of change. It has encouraged practical farming on scientific principles; it has by premiums and pecuniary aid promoted discovery and invention; by its shows it has fostered competition, stimulated enterprise, and created a standard of the best possible results, methods, processes, and materials in British agriculture. Its Journal has disseminated the latest results of scientific research at home and abroad, as well as the last lessons of practical experience. In its pages will be found the truest picture of the history of British farming. Starting as it did, under peculiarly favourable circumstances, and supported by writers like Philip Pusey and Chandos Wren Hoskyns, it commanded the pens of masters in the lost art of agricultural literature—men who wrote with the knowledge of specialists and with the simple ease of practical men of the world.

Without exaggeration it may be said that the general standard of excellence to which farming has attained throughout the kingdom has been to a considerable extent the work of the Royal Agricultural Society. For more than sixty years it has been the heart and the brain of agriculture. The local associations which now compete with it in popularity are in great measure its own creations, and it can contemplate with pride, unmixed with envy, the sturdy growth of its own children.

From 1840 to 1901, the whole period of the corporate existence of the Royal Agricultural Society, Queen Victoria was its Patron, and to Her Majesty's patronage the Society owes a great measure of its prestige and consequent utility. It has been said that "agriculture" is "the pursuit of kings": yet the feeling certainly existed that farming was beneath the dignity of gentry. Writing in 1783, Dr. Edwards (" A Plan of an Undertaking Intended for the Improvement of Husbandry") says : " Gentlemen have no right to be farmers ; and this entering upon agriculture as a business perhaps is a breach of their moral duty." It may have been this feeling which prompted Walter Scott to scoff at Killancureit's devotion to farming and depict that enthusiastic cattle-breeder as " a boorish two-legged steer." Fortunately for British farming, landlords have had a truer perception of their territorial duties as well as of their pecuniary interests. George III. delighted in his nickname of " Farmer George," contributed articles to Young's " Annals of Agriculture " as " Ralph Robinson," imported Merinos to improve British wool, maintained his model farm at Windsor, and experimented in stock-breeding. George IV. established two farms at Windsor to demonstrate in practice the two systems of Norfolk and Flemish husbandry. Queen Victoria's love of animals and inherited interest in farming were keenly shared by the Prince Consort, and have descended to their son.

Windsor, Osborne, Balmoral, and Sandringham have set the fashion, and afforded the model, to hosts of agriculturists. A detailed history, for instance, of the Windsor farms would epitomise the history of agricultural progress in the nineteenth century. Roads were laid out. Liebig's discovery that warmth is a saving of food was acted upon, and substantial buildings were erected, designed to economise the expense and labour of cattle-feeding, and at the same time to preserve manure from waste or impoverishment. Skilfully selected herds of pure-bred Shorthorns, Herefords, and Devons were formed for the production of beef; the soil was drained on scientific principles; the arable land, for the most part a stiff clay, was ameliorated and enriched by high farming; the latest inventions in implements or machinery were adopted; the grass-lands were improved by careful management; a model dairy, designed to meet the exacting requirements of modern sanitation and convenience, was erected; and, to supply the milk, a pure-bred herd of Jersey cattle was formed which soon became one of the most celebrated in the country.

The example thus set by Queen Victoria, by the Prince Consort, and by King Edward VII. as Prince of Wales has materially helped not only to raise the standard of British agriculture, but also to make a costly industry a fashionable yet earnest pursuit. By the Royal Agricultural Society the value of their aid is keenly felt; it can scarcely be expressed in words. But from the distinction of the patronage of Queen Victoria, the Society, both in its early struggles and its established position, for sixty years derived inestimable advantages. Nor was Her Majesty's patronage only a name. It was combined on many occasions with a personal and active interest in the success of the Society, which culminated in her acceptance of the office of its President in 1889, in the State Banquet given at St. James's Palace to commemorate the fiftieth anniversary of its corporate existence, and in her four visits to the Royal Show, held once more, after the lapse of thirty-eight years, in Windsor Park. Except so far as the prosperity of the Royal Agricultural Society affects the progress of British agriculture, the debt of gratitude which the Society owes to members of the Royal Family scarcely falls within the scope of this article. But it is impossible not to refer to the important help which the present Patron of the Society, King Edward VII., has repeatedly given to the Society, and, through its agency, to British agriculture. A frequent visitor, from the age of eight onwards, to the annual shows, and four times elected President (1869, 1879, 1886, 1900), His Majesty the King has given to the detailed working of the Institution a close personal attention which has done much to maintain the prosperity of the Society in the midst of agricultural loss and depression.

The work which the Royal Agricultural Society was established to do was not done by it alone. Other Societies, as well as Associations and Farmers' Clubs, assisted in spreading scientific and practical knowledge of farming. Among writers on the subject the Rev. W. L. Rham, Youatt, Henry Stephens, and John Chalmers Morton, as Editor of the "Agricultural Gazette" and the "Cyclopædia of Agriculture," did invaluable service. The schoolmaster was abroad, and the foundation of Cirencester Agricultural College in 1845 was a sign of the times. The want of agricultural statistics was severely felt, and had been emphasised by Sir James (then Mr.) Caird in 1850–1. But it was not till 1866 that the want was supplied. Attempts had been frequently made to obtain statistical information. In 1836, for instance, the Board of Trade sent letters to 126 clergymen in Bedfordshire, enclosing returns and asking help in filling them up. Ninety-nine returned no answer. Subsequent attempts succeeded no better. Fear of increased taxation closed the mouths of landowners and farmers. In 1855 a House of Lords Committee recommended the compulsory collection of statistics through the agency of the Poor-law officials. Eleven years later (1866) the Agricultural Returns of Great Britain for the first time supplied an accurate account of the acreage, the cropping, and the live-stock of the country.

The new alliance bore rich and immediate fruits. Science helped practical farming in ways as varied as they were innumerable. Chemists, geologists, physiologists, entomologists, botanists, zoologists, architects, mechanics, engineers, surveyors, statisticians, lessened the risks and multiplied the resources of the farmer. Steam and machinery diminished his toil and reduced his expenses. His land was neither left idle nor its fertility exhausted. Improved implements rendered his labour cheaper, quicker, surer, and more effective. New means of transport and increased facilities of communication brought new markets to his door. Commodious and convenient buildings replaced tumble-down barns and draughty sheds. Veterinary skill saved the lives of valuable animals. The general level of agriculture rose rapidly towards that which only model farms had attained in the previous period. Sound roads, well-arranged homesteads, heavy crops, well-bred stock, skilled farmers, and high farming characterised the era which adopted the Royal Agricultural Society's rule of Practice with Science. Cut off from their old resource of increasing production by adding to the cultivated area, deprived of the aid of Protection, agriculturists were compelled to adopt improved methods. The age of farming by extension had ended; that of farming by intension had begun.

To trace out in full detail a single point in which science has helped farmers would be the work of an article. Selection and outline are alone possible. Probably the most striking contributions which, during the period under review, were made to the improvement of agricultural processes are the science of manures, the science of drainage, and mechanical inventions.

Clay farmers had borne the brunt of the distress of 1815–36. Drainage alone could help them to regain their position or utilise the resources which science placed at their command. Blith, writing in 1651, in a style characteristic of the day, had asked with Bildad, "Can the rush grow without mire or the flag without water?" As a cure for the "cold moyst, spewing water that feeds the flagg and rush" he advocated drains from a yard to four feet deep, with proper outfall. In Essex and in Suffolk, a few years later than the time when Blith wrote, heavy lands were drained on the principles advocated in "The English Improver Improved." It was the custom to cut wedge-shaped ditches from three to four feet deep, filled at the bottom with stones, or cows' horns, or boughs of elm, white-thorn, or hawthorn, covered over with straw, and then with earth. The cost of these drains was, in 1727, about sixpence a rod, the landowner finding bushes and straw. In the *Weekly Miscellany* for August 22, 1727, S. Switzer had recommended the use of pipes "made of potter's clay" for the conveyance of water, and advertises that "the pipes are made by *Mr. Aaron Mitchell,*" potter, at "Vauxhall." It was two centuries before Blith's remedy was generally adopted. A century had elapsed before the practice of the Eastern Counties was imitated or Switzer's hints accepted. Ideas which seem to have lain dormant for years suddenly and simultaneously bore fruit. Yet neither Smith of Deanston nor Read had probably ever heard of their predecessors in the science and practice of drainage.

In 1823 James Smith of Deanston, then a man of thirty-four, began to cultivate the small farm attached to the cotton works at Deanston of which he was the manager. His system of deep ploughing and thorough draining converted a rush-grown moor into a garden. Agriculturists flocked to Perthshire to view with their own eyes the transformation and its cause. Smith's pamphlet (1831) on "Thorough Draining and Deep Ploughing" was widely read, and in 1834 he was examined as a witness before the Committee of the House of Commons which was then inquiring into agriculture. The value of his experience was at once recognised, and is now too obvious for remark. The principles once established, improvements in details rapidly followed. Josiah Parkes used the experience he had gained on Chat Moss to correct the excessive depth which characterised Smith's system, and Bailey Denton brought his engineering knowledge to bear upon the science of laying drains to the best advantage. The necessary appliances were soon at hand. Read's cylindrical pipes (1843), suggested to the inventor by the lead pipes of the plumber, and machines for their construction, were almost contemporaneously introduced.

At the Society's show at Derby in 1843 there were three machines. At York in 1848 there were thirty-four. In the latter year Sir R. Peel provided the necessary facilities for draining estates by advancing four millions of public money on terms which, for that period, were comparatively easy. It was not, however, till after 1851 that any considerable drainage works were carried out. But in the next twenty years hundreds of thousands of acres were effectively drained on scientific principles, with modern appliances, by co-operation between landlords and tenants. Yet, even here, the change had its disadvantages. The tops of the high ridges had been washed bare, while the good soil had accumulated in the furrows. When the lands were drained and ploughed down, uneven crops were, and still are, the heritage of the change.

Drainage was a necessary preliminary to profitable manuring. On undrained land farmers could not use to full advantage the new means of wealth which agricultural chemistry was placing at their command. But while drainage, in the main, helped only one class of farmers, the benefits of manure were universal. The practice of manuring is of immemorial antiquity. But it is in the extended choice of fertilising substances, in the scientific analysis of their composition and values, in their concentration and portability, and practical knowledge of their application that a prodigious advance has been made in the Victorian era.

Gervase Markham, writing in the reign of James I., gives a list of manures which were then known and employed. The list[1] is worth reproducing. It is as follows: Lime, marl, chalk, according to the nature of the soil; dung, fowls' dung, ashes, mud of ponds and ditches, seaweed; "spyteling of house floores," "sweepings of channels," rags of woollen cloth, shavings of horn, hoofs of horses and cattle; soap-suds, bracken, hair of beasts and hides, rotten pilchards, blood, entrails, and offal, malt dust, and salt. Hartlib, in the *Legacy* which passes by his name (1652), adds to this list "snaggrett" (shelly earth from river beds), soot, paring and burning, mixing of lands, "lupines and ploughing green plants into the ground." A century later were added bone manures, said to have been accidentally discovered by a Yorkshire fox-hunter in 1767; but they were in 1837 only used locally and over a very narrow area. Town-refuse in the days of bad roads and no railways could not be carted to a distance, and its use was necessarily restricted. In its furthest range its use was probably confined to hop-grounds and market-gardens. "Snaggrett," or calcareous matter, lime, chalk, and marl, though of value in supplying ingredients in which soils may be deficient, are ameliorating rather than fertilising agencies. For inland farmers in rural districts, the choice of manures was therefore practically limited to the ashes of vegetable refuse, "catch-cropping" with leguminous crops, folding sheep, and farmyard manure.

"Nothing like muck" became a proverb when there was practically "nothing but muck" to be used. On the same fact proceeded the severe restrictions against selling hay, straw, and roots off farms. In another sense the proverb is true—fortunately for the fertility of the country. Rich both in organic and inorganic substances, combining both nitrogen and minerals, possessing for the loosening of clay lands a peculiar value, farmyard manure is the only substance which contains in itself all the constituent elements of fertility. Our predecessors thus commanded the most valuable of fertilising agencies, the most certain and the least capricious. But in their open unspouted, unguttered yards, in their ignorance of the importance of the liquid elements, and with their poorly-fed stock, the manure was both wasted and impoverished.

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[1] *Farewell to Husbandry.*

Nor is it only in the quantity and quality of dung, or in its collection and treatment, that farmers have the advantage to-day. Formerly distant fields suffered when no concentrated and portable fertiliser existed, and, valuable though dung is, its use is limited. It can neither be applied to growing crops nor is it fitted for the drill. In the infancy, moreover, of agricultural science, men had little knowledge of the composition of soils, the necessities of plant life, or the special demand that each crop makes on the land. It is in all these respects that modern resources are multiplied. The supply of concentrated portable manures, adapted by their varied range to all conditions of the soil, capable of restoring those elements of fertility which each particular crop exhausts, and applicable at different stages of plant life, is the greatest achievement of modern agricultural science.

It is to the great German chemist Liebig that modern agriculture owes the origin of its most striking development. In 1840 his "Chemistry in its Application to Agriculture and Physiology" clearly traced the relations between the nutrition of plants and the composition of the soil. In his mineral theory he was proved to be mistaken; but his book revolutionised the attitude which agriculturists had maintained towards chemistry. So great was the enthusiasm of country gentlemen for Liebig and his discoveries, as popularised by men like Johnston and Voelcker, that the Royal Chemical Society of 1845 was in large measure founded by their efforts. But if the new agriculture was born in the laboratory of Giessen, it grew into strength at the experimental station of Rothamsted. To Sir John Lawes and his colleague Sir Henry Gilbert (himself a pupil of Liebig) farmers of to-day owe an incalculable debt. By their experiments, continued for more than half a century, the main principles of agricultural science were established; the objects, method, and effects of manuring were ascertained; the scientific bases for the rotation of crops were explained; and the results of food upon animals in producing meat, milk, or manure were tested and defined. On their work has been built the modern fabric of British agriculture.

With increased knowledge of the wants of plant or animal life came the supply of new means to meet those requirements. Artificial manure may be roughly distinguished from dung as purchased manure. Of these fertilising agencies, farmers in 1837 already knew soot, bones, fish guano, salt, hoofs and horns, and shoddy. But they knew little or nothing of Peruvian guano, of superphosphates, nitrate of soda, kainit, muriate of potash, rape-dust, sulphate of ammonia, or of the latest arrival, basic cinder. Nitrate of soda was experimentally employed in 1840, but in 1850 it was still a novelty. Peruvian guano was practically unknown before 1841. In that year 1,700 tons were imported; six years later (1847) the importation amounted to 220,000 tons. Bones were beginning to be extensively used. Their import value rose from 14,395*l.* in 1823 to 254,000*l.* in 1837. As originally broken in small pieces with a hammer they were slow in producing their effect; but the rapidity of their action was enormously increased by grinding them to a coarse meal. Rape-dust was not known in the South of England at the beginning of the Victorian era. In 1840 Liebig suggested the treatment of bones with sulphuric acid, and in 1843 Lawes patented the process and set up his works at Deptford. The same process was applied to coprolites, at the suggestion of Professor Henslow; and the rich deposits of Cambridge and other kindred forms of mineral phosphates, imported from all parts of the world, were similarly "dissolved." Even Peruvian guano was subjected to the same treatment. To a certain extent there has been a reaction against superphosphates and dissolved bones in favour of the raw phosphate manures. But wider knowledge shows that both the acid and the non-acid fertilisers have their different values for different kinds of soil.

It is in the means of applying appropriate manures to lands which are differently composed, and to crops which vary in their special requirements, that modern farmers enjoy exceptional advantages over their predecessors. Yet the science has not done all that was expected from it in the "Fifties"; the old view that the fertility extracted by a crop could be restored by a manure is scarcely confirmed by experience; and many a farmer has done himself as much harm as good by the application of fertilisers to which his land was unsuited.

Manure and drainage acted and reacted upon one another: the one encouraged the other. Previous rules of successive cropping were revolutionised; more varied courses were gradually and universally introduced. The old exhausting system of three crops of corn and a bare fallow was abandoned when land had been drained, and fertilisers, portable, cheap and abundant, were placed at the command of the farmer. Without manure, the attempt to grow turnips or clover failed; their introduction only protracted the shift, and aggravated the difficulty of inevitable exhaustion. Now, however, the lesson gradually forced its way that he who put most into his land got most out. Farmers recognised by experience, when the means were in their hands, that, on the one hand, if they ruined their land, their land ruined them, and that, on the other hand, only those who have lathered can shave. But the changes necessitated more frequent operations of tillage, which, without mechanical inventions, would have been too costly to be possible. Here, again, science came to the aid of the farmer, and supplied the means of making his labour cheaper, quicker, and more certain. The Royal Agricultural Society may legitimately pride itself on the useful part which it has played in introducing to the notice of agriculturists the new appliances which mechanical skill has placed at their service.

In tilling the land, sowing, harvesting, and marketing their crops, modern farmers command a choice of effective implements for which their predecessors knew no substitute. Between 1837 and 1874, ploughs in every variety, light in draught, efficient, adaptable to all sorts of soil, have been introduced. Harrows suited for different operations on different kinds of land, scarifiers, grubbers, cultivators, clod-crushers, came into general use. Steam supplied its motive power to the cultivator (1851–6) and to the plough (1857). As an auxiliary in wet seasons, or scarcity of labour, or foul land, or backwardness of preparation, the aid of steam is invaluable. But few farmers can afford to own both horse-power and steam-power, and without horses they cannot do. The time may, however, be near at hand when agriculturists may find it not only invaluable, but indispensable, to rely on an arm that never slackens, never tires, and never strikes. Corn and seed drills deposited the seed in accurate lines, and at that uniform depth which materially promotes the uniformity of sample so dear to barley-growers. Rollers and land-pressers consolidated the seed-bed. Manure drills distributed fertilisers unknown to farmers in 1837. Horse-hoes gained in popularity by improved steerage gear. Crosskill's Beverley reaper, which revived Bell's patent of 1826, was introduced in 1852, and was followed within the next twenty years by lighter and more convenient machines. Mowing machines, hay-makers, horse-rakes, shortened the work of the hay-field. Light carts or waggons superseded their heavy, broad-wheeled predecessors. Elevators lessened the labour of the harvesters in the yard.

Threshing and winnowing machines had been invented in the eighteenth century. James Meikle invented a winnower in 1710, and his son Andrew succeeded in building a thresher in 1786. Both were driven by horse or by water power, and in the North of England, on large farms, were generally used, but in the South of England, partly, perhaps, from the difficulty of supplying labourers with winter work, the flail was still almost universal for threshing. From 1850 onwards, however, steam began to be applied as a motive power, and within the next ten years several makers were busily competing in the manufacture of steam-driven machines. Nor did mechanical science neglect the live-stock industry, the development of which, in connection with corn-growing, was a feature of the period. Here, too, machinery economised the farmer's labour. He already knew the turnip-cutter and the chaff-cutter, but now machines crushed his corn, broke his cake, pulped his turnips, steamed and boiled his food. Without the aid of mechanical invention, farming to-day would be at an absolute standstill. No farmer could find, or if found could pay, the staff of scarce and expensive labour without which in 1837 agricultural produce could not be raised, secured, and marketed.

The improvements which have been indicated were not the work of a day. On the contrary, during the first few years of the reign—the only period passed under Protection—progress was neither rapid nor unchecked. Farmers in general were preparing for high farming; they had not yet adopted its practices. Whatever advance had been made between 1837 and 1846 was probably lost in the five succeeding years. Abundant materials exist for comparison. On the one side are the Reports of the Commissioners to the Board of Agriculture (1801–12); on the other there are the Reports published in the early numbers of the Journal of the Royal Agricultural Society, the evidence given before the Royal Commission of 1848 on tenant-rights and agricultural custom, the letters of Caird to *The Times* in 1850–1 and those of the Commissioner to the *Morning Chronicle* during the same period. It is plain that in 1846 no general progress had been effected, that high farming was still the exception, that the new resources were not yet utilised, and that more than half the occupiers of the land had made but little advance on the practices of the eighteenth century. Another period of disaster, short but severe, followed by a period of prosperity, forced home the necessary lessons, and ushered in the golden age of English agriculture from 1853 to 1874.

The railway manias and their collapse in 1837 and 1845–7 had depressed every industry. The failure of the potato crop in 1845–6 caused appalling famine, and led to the Repeal of the Corn Laws. When in 1846 Protection was abandoned for Free Trade, an agricultural panic was the result. Caird's pamphlet on "High Farming the Best Substitute for Protection" (1848) pointed out the true remedy. But for the moment he preached in the wilderness. The discovery of guano and the abolition of the Brick and Timber Duties were not considered an adequate set-off to the anticipated consequences of Free Trade in grain.

Agriculturists predicted the ruin of their industry, and their prophecies seemed justified by falling prices in 1848–50. Landlords and tenants had been encouraged by Protection to gamble in land. Extravagant rents were asked and paid, which were not justified by increased produce. Caird calculated in 1850 that rentals had risen 100 per cent. since 1770, while the yield of wheat per acre had only risen 15 per cent.—from 23 to 26½ bushels. In 1850 wheat stood at the same price which it had realised eighty years before (40*s.* 3*d.*). On the other hand, butter, meat, and wool had risen respectively 100 per cent., 70 per cent., and 100 per cent. The great advance which had been made was, in fact, in live-stock. Competition in farms had been reckless, and the consequences were inevitable when prices showed a downward tendency. Here and there rents were remitted, but few were reduced. Clay farmers, as before, were the worst sufferers; dairy and stock farmers escaped comparatively lightly. But the ruin was widespread. Much land was thrown on the hands of landlords, and efforts were made to convert arable into pasture.

From 1853 onwards, however, matters rapidly righted themselves. Gold discoveries in Australia and California raised prices; trade and manufacture throve and expanded; the Free Trade panic subsided; courage was restored. The Crimean War closed the Baltic to Russian corn. During the "Sixties," while the Continent was at war, England enjoyed peace. The seasons were uniformly favourable; harvests were good, fair, or abundant; the wheat area of 1854, as estimated by Lawes, rose to a little over four million acres; imports of corn, meat, and dairy produce supplemented without displacing home supplies. Even the removal of the shilling duty on corn in 1869 produced little effect. Counteracted as it was by the demand for grain from France in 1870–71, it failed to help foreign growers to force down the price of British corn. Wool maintained an extraordinarily high price. Lincoln wool, for instance, rose from 13*d.* per lb. in 1851 to 27*d.* in 1864. Even when corn began to decline in value, meat and dairy produce maintained their price, or even advanced. Money flowed into land as the best investment for capital. Men, like Mechi of Tiptree Hall, who had made fortunes in trade, competed for farms, and became enthusiastic advocates and exponents of scientific agriculture. Rentals rose rapidly; yet still farmers realised fortunes. Holdings were enlarged and consolidated; farmhouses became labourers' cottages; a brisk trade was carried on in machinery. High hopes were entertained of steam. Enormous and, as has since been proved, excessive sums were spent on farm buildings. Drainage was carried out extensively, and it was now that the general level of farming rose rapidly towards the best standard of individual farmers in 1837. Crops reached limits which production has never since exceeded, and probably, so far as anything certain can be predicted of the unknown, never will exceed.

During the period from 1853 to 1874 little attention was in England paid to improvements in dairying. But in live-stock progress was great and continuous, and the advance was the more remarkable as it was made in the face of the ravages of the rinderpest, pleuro-pneumonia, and foot-and-mouth disease. Foot-and-mouth disease had been more or less prevalent since 1839, and pleuro-pneumonia since 1840. But the outbreak of rinderpest in 1865 compelled energetic action.[1] In stamping out the pest the two other diseases were nearly extinguished, so that good results flowed from a disaster which caused widespread ruin. The multiplication of shows encouraged competition; stock-breeding became a fashion, and "pedigree" a mania among men of wealth.

It was in sheep and cattle that the improvement was most clearly marked, though neither horses nor pigs were neglected. Not only did Shorthorns, Herefords, and Devons attain the highest standard of excellence in precocity, symmetry, and quality, but other well-known breeds were rapidly brought to perfection. Especially is this true of Sussex and Aberdeen-Angus cattle. Other breeds were similarly improved by societies and the compilation of herd-books. Thus the Black cattle of South Wales and the Norfolk and Suffolk Red Polled breed had their herd-book from 1874. In sheep the improvement was, perhaps, even more striking. The historic Leicesters, Cotswolds, and Southdowns still held their own, but other breeds made rapid strides in the popular favour. The improved Lincolns, the Oxford Downs, Hampshire Downs, and Shropshires are almost creations of the period. Between 1866 and 1874 the number of cattle in Great Britain rose from under five millions to over six millions, and sheep had increased to over thirty millions in 1874. Nor was there only an increase in numbers. The average quality was greatly improved, and good sheep and cattle were widely distributed.

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[1] In the week ended Feb. 24, 1866, 17,875 cattle contracted the disease. The Cattle Diseases Prevention Act, dated Feb. 20, 1866, made the slaughter of diseased animals compulsory. The effect was seen at once. In the week ended March 3, 1866, 10,971 cattle were attacked, and in the week ended March 10, 10,056 were killed. At the end of April the weekly tables showed 4,442 attacked; towards the end of May, 1,687; in the last week of June, 338. In the last week of the year the number had dwindled to 8.—Appendix I to Report on Cattle Plague (Parliamentary Paper of 1868), page 4.

The year 1874 closed the era of agricultural prosperity. With 1875 began the period of depression, which in a modified form practically continued till the end of the reign. Both for farmers and manufacturers it had been long approaching, and the crisis affected all trades alike. The failure of Messrs. Overend and Gurney in 1866 was the first symptom of the rottenness of our commercial prosperity, though the crash was postponed till 1878. The Civil War in America, the Austro-Prussian and Franco-German Wars checked the industrial decline, and even enabled the country to increase its exports. Throughout 1872 trade expanded. In 1865 936 joint-stock companies were registered, with a capital of 119 millions; in 1870 there were only 552, with a capital of 37 millions; in 1873 the numbers rose to 1,119, and the capital employed to 144 millions. Much of the speculation was mere inflation. But it had its effect in a large increase in the consuming power of the population, and the consequent maintenance of high prices for agricultural produce. After 1873 the reaction set in.

One remarkable feature of the crisis that ensued is that it was not local, but universal. The South Sea Bubble ruined thousands, but in England only. The disaster of the Mississippi Scheme affected France alone. But new means of communication have broken down the barriers of nations and the civilised world suffers and prospers together. Prices fell, trade shrank, insolvencies multiplied. A railway panic in America, a fall in wages and the price of manufactured articles drove thousands from the towns to settle in the West and develop the natural resources of a virgin soil. In this country the extent to which trade had been undermined was fully revealed by the colossal failures of the Glasgow, Caledonian, South Wales, and West of England Banks in 1878.

Uneasiness began to show itself among agriculturists. Farming displayed some of the symptoms which characterised the inflated period of commercial prosperity. The same race for the employment of capital, the same mania for the investment of money at unsafe rates of interest, led to reckless bidding for land which raised rents beyond their legitimate limits. The demand for tenant-right has been generally treated as a sign and a consequence of high farming. But it is also a sign and a consequence of inflated rentals and acute competition for land. In adversity, when retrenchment is the policy of the day, the demand is scarcely heard; during seasons of healthy prosperity it is in this country rarely a burning question. Under the old system farmers brought little or nothing on to their holdings which they could not take away with them, except their crops. Common law gave no compensation for manure enriched by costly feeding stuffs or fertilising substances which entailed large expenditure without immediate profits. Even the "custom of the country" gave no redress, except in the three counties of Leicester, Lincoln, and Glamorgan, if a tenant's rent was raised upon his improvements, or if he received a notice to quit before he had recouped his outlay.

The necessary outcome of changed conditions was recognised as early as 1841, but Lord Portman's effort to obtain legal security for a tenant's expenditure of capital met with no success. With the same object, Pusey in 1847 introduced a Bill which was referred to a Select Committee of the House of Commons. Evidence was given to show that the want of security scared away capital and discouraged high farming. But the Committee shrank from recommending compulsory legislation, and the Bill was rejected. Again brought forward in 1850, the Bill passed the House of Commons, only to be thrown out in the Lords. For the next twenty years the question was discussed outside Parliament. From 1870 onwards the Chambers of Agriculture[1] identified themselves with the movement, and endeavoured to guide it to a fair and reasonable end. It was not till 1872 that the question was revived in the House of Commons. In that year Mr. James Howard and Mr. Clare Sewell Read introduced a compulsory Landlord and Tenant Bill, which was abandoned owing to the mover's illness. The Duke of Richmond's Agricultural Holdings Act of 1875 was the first step towards a recognition of the principle. But the measure was permissive only, and was correctly described as a "homily to landlords." The Farmers' Alliance was formed in 1879, with the object, among others, of pressing for further legislation. Though its own scheme was justly regarded as extravagant, the passage of the second Agricultural Holdings Act (1883) was assisted by its efforts. But a full measure of legal security is still wanting; the amendments of 1900 leave a good understanding between tenants and landlords the best guarantee for compensation.

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[1] The Central and Associated Chambers of Agriculture were formed in 1866, with the object of representing the political interests of Agriculture, the late Mr. Charles Clay and Mr Albert Pell being amongst the chief promoters of the organisation The first meeting of the Chamber was held in London on May 23, 1866, and was speedily followed by the formation of Local County Chambers throughout the country and by the adhesion of Farmers' Clubs that were then already in existence. It is scarcely necessary to enlarge upon the useful work which the Chambers are still doing in the cause of Agriculture.

Another symptom of uneasiness and another result of prosperity was the formation of the Labourers' Union of 1871. Wages had considerably advanced upon Caird's weekly average of 9*s* 6*d*. in 1850. It is always difficult to compare wages, owing to the varying extras paid for harvesting and piecework. But Mr. Wilson Fox in his "Wages and Earnings of Agricultural Labourers" has given figures which represent the average cash weekly wages from 1850 to 1899 without extras. From his tables it appears that they had risen from 9*s*. 1½*d*. or 9*s*. 3*d*. in 1850-2 to 11*s*. 10*d*. or 12*s*. in 1869-71. The rise had, however, not kept pace with the rise in prices, and the Union was formed to redress the balance. The cause of the labourers suffered from the manner in which it was conducted. Hostility was bred between employers and men; strikes were encouraged by labour leaders; farmers retaliated upon Unionists, whose resources were crippled by an organised lockout. Natural causes intervened to raise wages before the end of 1874; but the ill-feeling engendered by the struggle remained, and descended as an evil heritage to the bad times which were close at hand.

With 1875 the decline began. Accelerated and intensified by the exodus to the West, which was due to the commercial panic of 1873, the full pressure of American competition began to make itself felt. Steam carriage, the telegraph, and low freights neutralised the disadvantage of distance, and enabled the world to compete in home markets. Instead of there being one harvest every year, there was a harvest in every month of each year. The collapse of British trade checked the growth of the consuming power at home, and a series of inclement seasons paralysed the efforts of farmers. Bleak springs and rainy summers ruined the crops. For three years in succession (1875-76-77) harvests were deficient, and the increasing volume of imports prevented prices from rising to compensate the shortness of the yield. The potato crops failed; renewed outbreaks of rinderpest in 1872 and 1877, though speedily suppressed, hit stockowners hard. Land-agents began to complain of the scarcity of eligible tenants for vacant corn-land. Rents had reached and maintained their maximum; local taxation was rising rapidly; the tithe rent-charge was nearly 12*l*. above its par value. In the black year of 1879 the series of unprosperous seasons culminated in one of the worst, if not the worst, harvests of the century, in an outbreak of foot-and-mouth disease and pleuro-pneumonia, and a disastrous attack of foot-rot.

Of the reality and intensity of agricultural depression there could be no longer any doubt, though it was as yet mainly felt in the East and South of England, in corn-growing counties, and not among the grazing and dairying districts. The Duke of Richmond's Commission (1879) sat to inquire into the causes of the distress and suggest the remedies. The Report of the Commission (1882) showed the existence of distress of unparalleled severity; attributed its prevalence primarily to inclement seasons, but secondarily to foreign competition; and concluded with a variety of recommendations. Nearly all the suggestions of the Commissioners were carried into effect. Rents were so largely reduced that in England alone the annual value of agricultural land fell between 1880 and 1884 by 5¾ millions. Grants were made in aid of local burdens; cottages were improved, and allotments provided; stringent measures were adopted to stamp out disease amongst live-stock; attempts were made to deal with the sale of adulterated feeding-stuffs and dairy produce. The liability for tithe rent-charge was transferred to landlords (1891). The law affecting limited estates in land was modified by the Settled Lands Act. A Railway and Canal Traffic Act was passed which purported to equalise rates on the carriage of home and foreign produce. The permissive Agricultural Holdings Act of 1875 was superseded by a compulsory measure, with a modification of the Law of Distress. A Minister of Agriculture was appointed (1889), and a department established.

Still distress, artificially enhanced by currency complications and increased by gambling in options, continued to prevail, and even to extend to other branches of agriculture than corn-growing. The momentum of a great industry in a given direction cannot be arrested or diverted in a day or without heavy expense. It is unfair to blame farmers for obstinate conservatism if they take years to effect a costly change of front. Aims and methods were slowly adapted to new conditions. Wheat, barley, and oats gradually fell towards the lowest prices of the century. As corn-growing ceased to be a profitable industry, increased attention was paid to grazing, milk-farming, vegetables, fruit, and poultry. The wheat area of Great Britain shrank, between 1875 and 1900, from 3½ million acres to a little over 1¾ million acres. Permanent pastures were proportionately increased. Yet the change was scarcely made before the farmer found himself once more checkmated. The prices of fat cattle were well maintained till 1885, and of sheep till 1890. But they, too, gradually dwindled before the pressure of foreign competition. Within ten years the imports of foreign cattle were doubled. Still more formidable was the rising tide of dead-meat importation. The quantities of fresh beef increased within the period (1879–1900) by 3½ millon cwt. Fresh mutton rose (1882–1899) from 180,847 cwt. to nearly 3½ million cwt.; pig meat (1880–99) from 5 million cwt. to close upon 8 millions. Cheese increased (1872–1900) by more than a third; butter and margarine were more than doubled. Imports of wool rose from 153,757,000 lb. in 1879 to 394,342,000 lb. in 1898.

Farmers fought the unequal contest with courage and tenacity. But the stress told more and more heavily as time went on. Manufacturing populations seemed to find their markets everywhere except at home. Enterprise gradually weakened; landlords lost their ability to help, and farmers their recuperative power. It was inevitable that prolonged and acute distress should check costly improvements. The capital both of landlords and tenants was so reduced that neither could afford to spend an unnecessary penny. Retrenchment, not development, was their enforced policy. Land deteriorated in condition; drainage was practically discontinued; the expense of laying down land to grass was shirked, and the poorest arable areas tumbled down to rough pasture. Economy ruled in farm management; less cake and less manure were bought; labour bills were reduced, and the number of males employed in farming dwindled as the wheat area contracted.

Better harvests, reduced rents, the fall in tithe, relief from some part of the burden of rates, checked the process of deterioration; but agriculture continued to decline, as foreign competition made its pressure felt over an ever-widening field. Another Commission sat in 1893 to consider the question of agricultural depression. The Report of the Commissioners showed that since 1875 the capital value of land in Great Britain had fallen 50 per cent. Rents in many instances represented only a 2½ per cent. interest on capital expended in buildings, and the land itself returned nothing. Large tracts had been thrown on the landlords' hands or were lying derelict. Recent legislation has attempted, with more or less success, to remove some of the evils on which the Commission reported. The Small Holdings Act (1892) was an experiment, which was unfortunately tried at the wrong time and therefore proved a failure. The Sale of Food and Drugs Acts (1875–99) endeavoured to protect dairy produce, and the Fertilisers and Feeding Stuffs Act (1893) was passed to guard farmers against the frauds of dishonest manufacturers. The Agricultural Rates Act (1896) and the Continuation Act (1901) to some extent adjusted the burden of local taxation, though they did not settle the question of the equality in the incidence of rates as between real and personal property.

But, after all, agriculturists received little aid from the Legislature, and had to help themselves. Before the close of Queen Victoria's reign, rent reductions, favourable seasons, scientific methods, economy in expenses, the low prices of feeding-stuffs, combined to mitigate the severity of the depression. To those farmers who were fortunate enough to find a market, dairying was a stand-by, and the progress in the scientific and practical management of milk produce is the most striking feature of the period. Twenty years ago the use of the thermometer was unknown to English dairies. Butter, churned to a lump and made up by hand, varied in quality from day to day. The British Dairy Farmers' Association and its Journal (1876), the British Dairy Institute, the prominence given by the Royal Agricultural Society to shows of dairy appliances and the encouragement it has afforded to the study of the subject, the travelling dairy school and the cheese school of the Bath and West of England Society, the dairy schools and technical classes of Agricultural Colleges and County Councils, the labours of Mr. H. M. Jenkins, the writings of men like Dr. Voelcker and Professor Sheldon, the practical work of Lord Vernon, Canon Bagot, and others, have all contributed to the vast improvement in the treatment of milk.

Foreign methods have been carefully studied, the comparative merits of the different breeds of milch cows investigated, new and more exacting standards established, and the same labour bestowed upon the perfection of milking qualities which has produced such great results in the fattening qualities of cattle and sheep. In all the utensils and appliances of the dairy, down to the packages and boxes for marketing butter, mechanical invention has made triumphant progress. Improved churns in endless variety, sterilizers, butter-workers, cooling and heating machines, milk-testers, are now in common use. Milking machines have not yet succeeded, mainly from the difficulty of ensuring the cleanliness of the tubes. But the separator has produced the greatest revolution in dairy management. The centrifuge, invented in 1867 for separating liquids from paint and other solid substances, was the parent of the Lefeldt and Laval separators (1879), and other varieties of the implement, which have been improved by successive developments, until the machine now leaves scarcely more than 1 per cent. of cream in the milk. An implement like the hand power "Maidstone Royal" will separate 45 gallons of milk in the hour, and it is not the least important point in the mechanical improvement that it can be purchased at a third of its former cost. If there is a bad side to this progress, it lies in the fact that the processes of butter and cheese making are growing too elaborate and scientific for the ordinary run of farmers. There is certainly a danger lest the pursuit should become confined to creameries and associations, and lest dealers should refuse to accept butter which has not come from a factory.

Nor is it only in dairying that agricultural advance has been uninterrupted. Production may have reached its limits, but improvement in agricultural processes has been continuous, and the general approximation of farming to the best standards may be legitimately regarded as progress. Science has not stood still. Meteorology is attempting to solve the perplexities of farmers by forecasts of the weather. Experiments are being conducted in the cross-fertilisation of crop and pasture plants, designed to produce new breeds of plants of improved precocity, increased vigour of growth, greater power to resist the attacks of disease or insects, heavier weight of grain, better quality and yield of crop. In this direction much remains to be done if the National Association of British and Irish Millers is right in preferring American hard wheats as containing more gluten and less starch than English wheats, though home-grown produce will probably never lose its value for the flavour which it gives to its foreign rivals.

Field and stock-feeding experiments have been carried on since 1877 by the Royal Agricultural Society on land provided by the Duke of Bedford at Woburn. Pastures and meadows have received a care and attention which were never before bestowed. The late Mr. De Laune and Mr. Carruthers carried on the work of improving grass-lands, which stood still since 1824.

Forestry has revived as a science. Improvements in live-stock have continued, and even received a fresh impulse from the failure of corn-growing. Not only have the principal breeds been brought to perfection, but societies and pedigree-books have become almost universal. Among the most important of the new foundations are the Shire Horse Society (1877), the

Hackney Society (1883), the Ayrshire Cattle Herd-book (1877), the Jersey Cattle Herd-book (1880), the Shropshire Sheep-breeders' Association and Flock-book (1883), and the Suffolk Flock-book (1887). To horse-breeders and stock-owners the progress of veterinary science has proved an incalculable benefit. The Royal College of Veterinary Surgeons (1844), the Royal Veterinary Colleges of London, Edinburgh, and Glasgow, have superseded the old cow-leech by skilful practitioners, who perform tracheotomy or detect microbes with all the skill of their medical brethren. The Worshipful Company of Farriers have raised horse-shoeing to an art, and Registered Shoeing-smiths (1890) guarantee the excellence of their work by the addition of letters after their names. The increased importance of poultry farming has borne fruit in improved breeds and scientific management.

Miss Ormerod (1828–1901), for years the friend and adviser of farmers on the subject of attacks by insects on crops and live-stock, left behind her as her life work a systematised agricultural entomology. The *Bouillie Bordelaise* and the Burgundy mixture have helped to protect potato crops, and still more recently some of the forms of charlock have been destroyed by the spraying of solutions of copper salts. Basic slag (1883) or "Thomas's Phosphate Powder" is a new and useful aid to the improvement of old pastures.

Well-known implements have been improved in detail, and fresh novelties introduced. In the latter class the reaper and binder is the most important. Wire binders were brought over to Europe in 1873, but farmers and millers alike protested against the use of wire as a binding material. The Appleby string binder (1878–9) removed the obstacle. Though the later straw binder has hardly passed beyond an experimental stage, the reaper and binder is now in common use as one of the most valuable and efficient substitutes for hand labour. In the cultivation and harvesting of cereals, machinery has, in fact, been brought to high perfection; but in the thinning and lifting of turnips, or even in the planting and raising of potatoes, there is still room for labour-saving implements. The chilled-breast digging plough and the steam digger are largely employed.

Power presses (1880), though chiefly employed to compress hay and straw for transport, may prove useful for storage purposes. Ensilage provides a resource in wet seasons. Sheep-shearing machines have helped the flock-master. Wire and corrugated iron have cheapened fencing and farm buildings. Petroleum engines have already proved themselves valuable aids for all sorts of work on the homestead. Mention has been already made of the progress which has been effected in dairy appliances and utensils, and especially of the separator, which ranks with the reaper and binder as one of the triumphs of mechanical invention in the last quarter of the nineteenth century.

Meanwhile agricultural education made prodigious strides. Within the last quarter of the century numerous educational centres were established in addition to those already in existence. Aspatria (1874), Downton (1880), the University College of North Wales (1884), followed by collegiate centres in South Wales, Kent, Yorkshire, Cambridge, Nottingham, Reading, Durham, the Agricultural College at Uckfield, the Cheshire Agricultural and Horticultural Institute, the Harris Institute at Preston, the Eastern Counties Dairy Institute, and similar institutions in other parts of the country, afford practical and scientific instruction to numbers of future landlords, land-agents, and farmers. In the expenditure on technical education (915,134*l.* for 1899–1900) instruction on agricultural and rural subjects was represented, and the work of the classes and lectures organised by County Councils continues to extend and increase. Considerable sums (7,850*l.* for 1900) were also distributed by the Board of Agriculture in subvention to collegiate centres, the training of teachers, and other subjects connected with instruction in farming matters.

Education on a scale so varied and extensive must inevitably produce results, and its effect was already visible among the younger generation before the close of the Victorian era. But just as farmers were growing more capable, agricultural labourers were becoming more incompetent. For them education was doing little or nothing which did not unfit them for their industry. What was most wanted was elementary instruction adapted to the needs of agriculturists. Continuation and night schools begin too late. No effort, rightly or wrongly, was made to imitate continental practices, close the schools from haymaking to harvest, and increase the winter hours. No attempt was made to introduce text-books adapted to the future needs of country children.

Whether a more suitable system of rural education might have checked depopulation of country districts is a question which falls outside the limits of this article. But our educational system is passing through a period of transition, the ultimate effect of which cannot be foreseen. At the present moment the younger generation in villages are better educated than their parents, and their superiority fosters distaste for rural life. Moreover, education in its first effects dissatisfies lads with their surroundings: its second and later effect is to reveal new sources of interest in the most unpromising conditions. In the future, education may therefore help to repeople the rural districts which it now tends to depopulate.

A sketch of the history of Victorian agriculture affords no scope for the discussion of remedies or for speculation on prospects. It necessarily deals only with accomplished facts. But the general picture which the record presents is one of which landlords and tenants may well be proud. It inspires courage rather than despair. It shows a marvellous progress in all the processes of agriculture, which has been effected in the face of heavy sacrifices and innumerable difficulties, and leaves agriculturists better equipped to profit by prosperity or to combat misfortune than at any previous period. High farming has lost the buoyancy and enthusiasm of youth, and its later years have been soured by disappointment. But it is incredible that English agriculture is destined, on any large scale, to be permanently reduced to the self-sufficing domestic industry from which it has emerged during the Victorian Era.

ROWLAND E. PROTHERO.

SOME PRACTICAL HINTS ON CIDER-MAKING.

In the Journal of 1888 [1] there was an excellent contribution by Mr. D. R. Chapman, entitled "Recent Improvements in Cider and Perry-making;" but as no further article has since appeared in the Journal on the subject, and as public attention and interest, evidenced by numerous letters to the newspapers, are increasing, I have been requested to deal with the progress which has been made since that date to the present time.

The first steps towards this progress were the Trials of Cider-making Plant carried out by the Society after the Plymouth Meeting of 1890, which took place at Glastonbury in the autumn of that year, and which were the subject of an interesting Report by the late Mr. Dan Pidgeon.[2]

The results obtained from these Trials, in which I took part, induced me to purchase the prize mill, and, subsequently, the prize press. Prior to this, the cider on my farm had been made in the ignorant and careless way common to the country; but once having started on the course of improvement as to machinery, I was determined to carry out further improvement in the process of cider-making generally.

This I felt sure could be done, for one barrel of cider would be bad and another worse, without any apparent cause; and having certain dim ideas of yeasts, microbes and fermentations, this seemed to be the direction in which research should be made. The difficulty was to know how to begin, as being ignorant, though unprejudiced, myself, I had to combat the ignorance and prejudice of those accustomed to the then prevailing methods.

At the Gloucester Show of the Bath and West of England Society in 1893, I had many talks with Mr. James Harper, of Ebley, near Stroud, who had already made many experiments in the right direction for improving the cider industry, and who has since done much good educational work amongst farmers in various districts. Mr. Harper gave me many valuable ideas and much assistance, and I have always been most grateful to him for supplying a missing link in the chain of progress.

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[1] Journal, R.A.S.E., Vol. for 1888, pp. 171–195.

[2] *Ibid.* Vol. for 1890, pp. 764–776.

In 1893, the Migratory Cheese School of the Bath and West of England Society was being held on one of my farms at Butleigh, and Mr. F. J. Lloyd, under whom it was carried on, kindly consented to keep his laboratory going after the Cheese School was over, and to turn his attention to the scientific examination of the cider problem.

The following year, 1894, I induced the Bath and West of England Society to take the matter up in earnest, and from then until now they have carried on the scientific part of the experiments at Butleigh, I undertaking to provide the apples and the necessary plant for the work. Upon the results of these experiments the present article is founded.

The Board of Agriculture latterly helped the Society to the extent of 100*l.* a year, but this grant was nearly being taken away because the Inspector thought that what we were doing was "Research" and not "Education." I pointed out to him the impossibility of trying to educate people unless one knew what to teach them, and that scientific research was the only way to get at this.

Luckily I had kept a visitors' book, and when I showed him the names, some hundreds in number, of farmers and others interested in cider-making who had visited the Laboratory—among them many now well-known prize-winners who had never even thought of exhibiting their cider at any Show until they had been to Butleigh and had had their minds turned into the right groove—he then admitted the educational value of the work. "Such is the way the King's business is done," as Samuel Pepys remarks.

The first care of a cider-maker is, of course, to get good fruit, the same sorts of which vary immensely in character and constituents on different soils in different seasons, and according to the way in which the orchards are treated.

The generality of farmers do not take nearly enough care of their orchards as to keeping the trees clean, pruning out the dead wood, or manuring. The best way, probably, of doing this last is by feeding pigs in the orchards, taking care to remove them some time before any apples begin to fall.

During the last fifty years, planting the right sorts has been much neglected. With too many people "A" has been an apple tree, and blanks in orchards have been filled up indiscriminately, making it exceedingly difficult to name the kinds, or in picking to separate the various fruits. Moreover, it is very rare that young trees planted in an old orchard really do well;

so that it is generally far better to plant new orchards, carefully keeping the same kinds of apples together in, say, a row of a sort, which makes it far easier to select and blend the fruit.

It would be outside the scope of this paper to describe the varieties of apples. I will only say there are far too many: probably a dozen kinds of the latest ripening varieties would be enough in any locality for cider-making. To make confusion worse confounded, the names of the apples vary in almost every parish, and I also often meet with many excellent apples with no name at all, or none that I can find out.

A notable example of this is one we call at Butleigh "No. 14," which is very high in sugar. This will be seen in the annexed Table, which contains the names and analyses of a few good apples in this district, as well as that of a wild crab-apple, which may be of interest for the purposes of comparison:—

Composition of the Juice of Various Apples

Variety	Sp. gr.	Solids	Acid	Sugar	Tannin
Broad Leaf	1·0775	19·22	·41	17·24	·48
Little Trot	1·0740	17·84	·44	16·66	·78
Kingston Black	1·0672	16·60	·64	14·08	·11
Red Jersey	1·0660	16·14	·16	14·92	·24
Norton's Bitters	1·0660	15·74	·24	14·70	·41
Bitter Jersey	1·0650	16·00	·16	13 33	·25
Gins	1·0635	15·94	·17	13·88	·19
Chisel Jersey	1·0620	15·14	·20	14·49	·35
White Jersey	1·0600	14·92	·13	13·88	·17
Lester's Bitters	1·0607	15·06	·18	13·69	·36
Royal Jersey	1·0656	16·82	·17	15·15	·19
Butleigh No 14	1·0934	23·16	·24	21·72	·21
Crab (wild)	1·0645	14·60	2·40	11·76	·78

There is an old saying that when an apple is fit to eat it is fit to drink, *i.e.* to make into cider, and as all apples do not ripen at the same time they must be stored until fit to grind. They should not be left in heaps out in the orchards exposed to weather and birds, but gathered dry and put into hurdle stores, as suggested by Mr. Harper, or into lofts, or even waggons. Above all things they must be clean and dry, and free from rotten apples, leaves and twigs.

Some years ago an old man near here was celebrated for his cider, and it was generally reported that his wife used to wipe each apple in her apron before it went into the mill.

It is often suggested that apples should be washed before being ground, but an objection has been made that the yeast would be washed off. We tried this at Butleigh, but found it made no difference; the yeast was not washed off, and perhaps there was not enough dirt on the apples experimented with to make it a fair test.

Mark Twain, in his "Life on the Mississippi," says that "to make sugar is really one of the most difficult things in the world, and to make it right is next to impossible. If you will examine your own supply every now and then for a term of years and tabulate the result, you will find that not two men in twenty can make sugar without getting sand into it."

Now we have a very simple way of excluding rotten apples, dirt or leaves, which, however carefully the fruit is gathered, are bound sometimes to get in, and which, though not intended to adulterate, are as much out of place as the sand is in the sugar. A sloping trough, about a foot square and some eight or ten feet long, leads from the apple loft to the mill. In this trough, and about three inches from the bottom of it, are removable gratings, consisting of wooden strips one inch wide and spaced about one and a quarter inch apart. The apples are fed in at the top of the trough and roll down it, and the bulk of the leaves, grass and sticks fall through the grating, and rotten or undesirable apples are easily picked out in their descent by a man standing by. Out of apples bought from farmers I have often known a big basket nearly full of rubbish taken at one grinding, which, if it had gone into the cheese, would not only have taken up valuable space, but would have contaminated the juice. This simple apparatus, which any one can make for a few shillings, is well worth the attention of every cider-maker.

To pick apples clean, Mr. Harper advised a cloth spread under the trees, into which they should be shaken down. I tried one and found it worked well, but I think a net is better, as it is easier to move it from tree to tree, lighter to handle, and easier to dry and store when not in use. I have so far only experimented in a small way with an improvised net, and, as the result of its working, I hope another year to get a proper one made.

It has generally been considered that the first fallings of apples will not make good cider, but, from the analysis of these apples, we found that they were nearly as good as the others. The reason of this idea seemed to be solely due to the warm weather early in the season causing a too rapid fermentation, but, by constantly watching the juice and testing with a hydrometer, and by early and frequent racking, we produced cider from the first fallings almost as good as any other made during the season.

As regards the grinding of the apples, the existing good mills, of which there are several—such as that which gained the Royal prize in 1890—do their work very well, and they are so well known that they need not be specified.

Lately, an American mill has been introduced into this country, which is on a somewhat different principle, having a high-speed revolving drum or grater, as it is termed, which grinds the apples into a much more pulpy condition than the mills before alluded to. I have seen it at work, and the owners seemed well satisfied with the results produced, but beyond that I cannot speak either for or against it.

Mr. D. R. Chapman in his paper in the Journal of 1888 says that the pulp should stand for from twelve to twenty-four hours, or even several days, before being put up into a cheese. From our experiments, we have not found any advantage from letting the pulp stand. It certainly tends to make the cider a darker colour, but this is a doubtful advantage, as the natural colour, except perhaps in very poor and inferior cider, is the most pleasing to the eye and best suits the public taste. But he is quite right in saying that the theory of many old cider-makers that the pips should be cracked is quite wrong.

In the Somerset district it was always the fashion to make up the cheese with "reed," the technical name for straw prepared for thatching. This we have entirely discarded as being dirty and troublesome. "What can be cleaner than nice sweet reed?" is often said by the old fashioned cider-maker; but I expect if he were to put that reed to a microscropical examination his ideas would be altered.

We have never used horsehair cloths, such as are general in many districts. Judging from what I have seen of them, they are heavy to manipulate, take up a good deal of room in the press, are expensive, and difficult to clean. We began by using Manilla cloths, but the last few years these have been superseded by cotton cloths, which are in every respect a great improvement.

The pomace is packed into them, and between every four cloths a wooden grating is placed, which helps to keep them in position and distributes the pressure. The press with the Manilla cloths will take a cheese that would yield ninety gallons of juice. A cheese put up with cotton cloths, owing to their taking so much less room, gives us 120 gallons, so I strongly advise every cider-maker to adopt them.

At this point, the juice being pressed out, the hydrometer comes into play for the first time, and its employment must be continued to the end, the density of each pressing being carefully noted in a book. By the use of the hydrometer and a

Table prepared by Mr. Lloyd, the amount of alcohol can be readily ascertained at any moment—a most important point in the subsequent dealings with the cider.

The next process is the keeving; the juice is pumped into vats or pipes with the heads taken out and left to ferment for a few days, more or less, according to the temperature of the air. The colder the weather, the more slowly the juice ferments and the easier it is to deal with. When the frothy head which rises shows signs of cracking, it is skimmed off and the cider is pumped into barrels, where it is allowed to ferment for a few days longer, and is then bunged down lightly.

It has generally been supposed that a brown head is better than a white head. We tried hard to find out whether there was anything in this, and have come to the conclusion that the more dirt and rotten apples there are in the cider, the browner is the head. This must be the case if it be considered why the head is formed. The carbonic acid gas which is generated in the fermentation, rising up in small bubbles to the surface, sticks to all the small particles of solid matter in the cider, and brings them up with it. These particles, being mainly pomace and dirt, give the brown colour to the head. If the juice were perfectly clear to begin with, there would be none of this, so a white froth only would rise. Owing to clean apples, cotton cloths, and care in putting up the cheese, we seldom now have such a thing as a brown head.

It is generally the custom with farmers to have their barrels standing up; they certainly take less room that way, but, as a practice, it cannot be defended for a moment. They are never full to the top, and the head, in time, becomes dry. The cask is then no longer air-tight, and terrible evils ensue. This is well known to be the case, as ashes, or sand, or mortar are often spread over the head of the cask in an attempt to keep it air-tight.

The proper and only way is to lay them down, which goes without saying to anyone who has thought about the subject. The old question in seamanship comes in appropriately here. *Q.* "How do you stow a cask?" *A.* "Bung up and bilge free."

In this, the first part of the fermentation, each barrel must be watched carefully, and tested with the hydrometer every two or three days. Any barrels which show that they are fermenting more rapidly than others must be racked, and still watched and racked again and again, so as to check the fermentation and make it as slow as possible until the cider arrives at the proper gravity for filtering. It is at this stage that watchfulness and the constant use of the hydrometer are of the greatest importance.

After some two, or even three, rackings, the cider may have fallen in gravity somewhere between 1·030 and 1·020 ; it is then time to filter it. In former days, those few people who ever attempted filtering used conical bags of fustian, in which were put various mediums, one worse than the other, to help the process. The cider was thoroughly exposed to the air, and the whole business was slow and messy. Other modes of filtering I have also heard of, such as through sand or charcoal ; but now all difficulties are removed by the use of Lumley's German filter, with paper pulp as a medium. This is clean and effective, and the cider, during the process, is not exposed in any way to the air. It is pumped through the filter with a force-pump, under a pressure of about 7 lb. to the square inch, and, with an ordinary sized filter, 300 gallons can be effectually treated in a day.

These filters are somewhat expensive, but in spite of this, all the cider-makers in my district who mean business have adopted them. Indeed, I look upon the filters, the hydrometer, and the thin cloths before mentioned as indispensable factors in successful cider-making.

From the filter the cider is pumped into barrels and bunged down (or, if necessary, it may be bottled direct from the filter), when its manufacture may be considered complete. The best gravity for bottling seems to be from 1·025 to 1·015. In bottling from the barrel it is a very good plan to turn carbonic acid gas into the barrel on the top of the cider, from a tube of compressed gas. This in no way "gases" the cider, but it prevents the external air from getting in, and also prevents the cider from parting with any gas it may have in it. The same plan is also an advantage when drawing off cider into smaller casks.

After bottling, the fermentation is slow, so the character of the cider required must be ruled by the gravity of the cider when bottled.

Preservatives, or anti-ferments, are much advertised, but let all cider-makers give them a wide berth. They are composed mainly of salicylic acid, which is, as most men know, prejudicial to health. Where cider is properly made, nothing of this sort is in any way necessary. The tannin naturally found in apples is the best preservative, but as this varies in different kinds of fruit, part of the cider-maker's art is to learn to mix the apples before grinding, so as to get the amount necessary.

In France I have seen cider stored in huge receptacles built of granite and holding six thousand gallons or over, which reminded me more of a limekiln than anything else. These are always closed with a seal of carbonic acid gas, and, as the cider is drawn off, more gas is let in so that no air can possibly enter. This gas is made on the spot by a simple apparatus, and also, if I remember rightly, the gas given off in the process of fermentation is saved and stored to be used as wanted.

Many "manufacturers" of cider "gas" their cider (which has sometimes been previously sterilised) when bottling, to ensure effervescence, but to my mind there is always a certain metallic taste which betrays the process, and it is not to be compared with the natural gas produced by fermentation in the bottle. No doubt, however, this is most convenient when dealing with large quantities, and prevents a slight deposit in the bottles, which is an inevitable accompaniment to any fermentation in them. The price obtained for bottled cider will not cover the cost of "disgorging," as in the case of champagne.

The more one studies any subject the more one sees one's ignorance. Although we have now learnt to make cider with a good degree of certainty, of a quality which would have been utterly impossible and beyond all hope or expectation only five years ago, yet much remains to be done, especially in the study and cultivation of yeasts and fermentation. This is such highly scientific work, and wants so many special appliances and conditions, that it is impossible to do anything towards it, situated as we are at present.

We have done a little in this direction at Butleigh, and enough to make us long to go further.

In one experiment we cultivated some yeast from some of my hothouse grapes, and fermented some cider with this culture; the result was an excellent brew of a distinctly vinous flavour.

I believe great strides are being taken in this direction in Germany and other foreign countries, but there they seem to have unlimited money at their command and the best scientific men to carry out experiments.

It undoubtedly will be the lot of comparatively few farmers to become first-rate cider-makers. I often think a farmer has to attend to so many things, each one of which would in itself be a life study, that he can do but few really well; and of these cider-making is not one.

His premises are often utterly unsuited for it, and his mind is not trained to work with the accuracy or science such a highly chemical process needs. As home-made beer and small breweries have died a natural death in favour of large breweries under highly trained experts and a business staff for the sale of their product, so will cider-making for the British public have to be conducted by people who make it their special study. This has so far been the case only to a very limited extent, so the public have not been supplied with good cider of special brands in the way many recent writers in the newspapers have rightly urged should be possible. If cider becomes a more universal drink, as it certainly will under proper management, it will be as impossible for the generality of farmers to turn their apples into cider to meet the public demand as it would be for them to turn their barley into beer. Their duty must be to grow the apples, and by attending to the trees, as to pruning, manuring, and grafting to good sorts, and in supplying the fruit clean, they will be able to realise good prices and enjoy a constant demand.

Landlords in a cider country have continual requests from their tenants for young trees for filling up blanks in orchards; but often very little care is bestowed in planting or protecting the trees afterwards from sheep, cattle, and wind. Indeed, in one case I know of it did not even come to planting. Some years ago I supplied a tenant of mine with a number of young trees. He hauled them into his orchard and dumped them down. That night a heavy fall of snow took place, and when it was gone he thought it was time to plant the trees. On coming back to them he found the bark completely stripped off by sheep, rabbits, and what not. This is by no means encouraging for the landlord. The tenant never had any more trees given him, and the consequence is the blanks are still in the orchard, which by this time might have been filled up by trees in bearing.

I have alluded several times to my visit to France. It came about in this way. Mr. Farwell, Steward of Cider at the Bath and West of England Show; Mr. T. F. Plowman, the Secretary; Mr. Lloyd, and myself, went over as a deputation from the Society to the Conference of the French Pomological Society, held at St.-Brieuc in 1895. We were received with the greatest kindness by the French cider-makers, who were so delighted with the work which had been carried on at Butleigh that they had the papers all translated into French, and gave Mr. Lloyd and myself a gold medal each, as a mark of their appreciation of it.

Frère Abel, one of their leading men, came over and paid us a visit, and his entry in the visitors' book may be interesting as showing how pleased he was with what we had to show him:—

"7^{me} Nov^{re}. 1895.—Frère Abel, Vice-Président du Syndicat Pomologique de France, à Ploërmel, avec les plus sincères félicitations pour les intéressants et si utiles travaux de MM. Neville Grenville et Lloyd."

People often say that cider causes rheumatism, but this I do not for a moment believe to be the case. When I was a boy I certainly remember many rheumatic old men in this district, but now they are as rare as they were then common. This I attribute to better clothes, food and houses, for they drink as much cider as ever. The fact of the matter is, that cider and a clay soil go together, and rheumatism and a clay soil go together, and I believe cider to be Nature's antidote to rheumatism.

In conclusion, let the cardinal maxim in cider-making, as in dairying, be cleanliness; and I may safely add that, by attending to the mottoes of the two great Agricultural Societies with which I have had the honour of being long connected—namely, "Practice with Science," and "Work and Learn"—a very great advance has been made since 1893 in the ancient and noble art of cider-making. I cannot resist adding the words which Gerarde wrote about 1597: "Forward in the name of God; graffe, set, plant and nourish up trees in every corner of your ground; the labour is small, the cost is nothing; the commodity is great, yourselves shall have plenty; the poor shall have somewhat in time of want to relieve their necessitie, and God shall reward your good mindes and diligence."

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THE RELATIONSHIP BETWEEN HUMAN AND BOVINE TUBERCULOSIS.

It is scarcely open to doubt that the Congress on Tuberculosis which assembled in London in July last must have been viewed in advance with a certain amount of apprehension, if not of actual mistrust, by cattle-owners and butchers. A special section had been set apart for the discussion of tuberculosis of animals, and it was well understood that the distinction thus accorded to a disease of the animals of the farm was entirely attributable to the belief that human and animal tuberculosis were identical affections, and communicable from the lower species to the higher when the circumstances were favourable. There was, therefore, considerable reason to fear that the results of the deliberations of the Congress might include a more widespread distrust of tuberculous beef and milk as sources of human tuberculosis, with a consequent increased stringency in the regulations designed to counteract this danger to mankind.

As everyone now knows, these forebodings were not realised. The declared opinion of a single individual sufficed to entirely shift the ground of controversy, and raised afresh a question relating to animal tuberculosis which was universally regarded as closed. Instead of having to discuss the measures necessary to prevent the infection of human beings with products derived from tuberculous animals, the Congress found itself confronted with a grave doubt as to whether there was any relationship whatever between human and bovine tuberculosis, except a superficial resemblance in the lesions associated with them. Above every other incident connected with the deliberations of the Congress, this was the one which impressed the public mind.

Very naturally, it has attracted the closest attention from those whose monetary interests appeared to be in danger from a possible crusade against the use of the flesh and milk of tuberculous cattle. It is to be feared, however, that there exists a certain amount of misunderstanding as to what actually transpired at the Congress in connection with this matter, and even as to the views which were there formulated by Professor Koch regarding the relationship between human and bovine tuberculosis. The purpose of this article is to show what were the foundations for the views generally held prior to July last regarding the connection between tuberculous disease in different species, and the extent to which these foundations have been undermined by facts recently discovered.

Although prior to 1882 there had been accumulated a considerable body of evidence pointing to the identity of human and bovine tuberculosis, such identity was by no means generally admitted. The evidence produced consisted in the similarity of the lesions in naturally occurring cases of tuberculosis in man and cattle, and in the alleged successful inoculation of animals with materials taken from human beings, the lesions set up in such experimental cases being similar to those met with in natural cases of the bovine disease. The criterion of the identity was thus sought in the structure and appearance of the tuberculous lesions in natural and experimental cases of tuberculosis in the various species; but it must be admitted, especially in the light of facts recently discovered regarding the diversity of cause in morbid processes once supposed to be identical, that the evidence thus obtainable was not sufficient to remove all doubt as to the relationship between the human and the bovine disease.

In the first place, it is now well established that the same cause, operating on animals of different species, may induce lesions that are by no means identical in appearance or structure; and, secondly, it has also been demonstrated that structural alterations which cannot with certainty be distinguished from one another by their appearance can be proved to be dissimilar as regards their cause. For example, it is now known that quite a large number of bacteria are capable of provoking the formation of abscesses in man and animals, and in many cases of that kind there is only one way of determining whether any two abscesses are identical in nature, viz. by ascertaining what organisms are present in them.

In short, when we speak of identity of diseases in bacteriology, we are at liberty to ignore everything except the cause of the morbid processes, and when that has not been discovered, or is not capable of ocular demonstration, there is always room for error in seeking to establish identities or dissimilarities.

It was in 1882 that Koch furnished a new criterion for judging whether human and bovine tuberculosis were identical. By the application of new methods of research, devised by himself, he succeeded, where many previous observers had failed, in demonstrating that the tubercles of human tuberculosis contain a living organism, which has since been named the bacillus of tuberculosis, or, in honour of its discoverer, Koch's bacillus. He was able to isolate this organism; that is to say, he succeeded in growing it in a state of purity outside the body, and could carry on its growth in that way for an indefinite series of generations. He thus provided himself with abundant material for studying the organism in respect of its form, size, staining reactions, and effects when experimentally inoculated into various species of animals.

The evidence which Koch offered to prove that the organism which he had discovered was the cause of human tuberculosis was: (1) Its demonstrable presence in the immense majority of lesions diagnosed as tuberculous, and (2) the identity of the effects produced in animals by inoculating with pure cultures of the bacillus, and with materials taken direct from tuberculous lesions of the human subject. All this, of course, had a bearing only on the causation of human tuberculosis. But when he applied similar methods of investigation to cases of tuberculosis in cattle and other animals, identical results were obtained. The lesions in such cases were proved to contain what, by all the tests which Koch could then apply, was the same bacillus as the one present in cases of the human disease. The bacilli from man and animals were found to be identical in respect of form, size, staining properties, mode of growth in artificial cultures outside the body, and effects when experimentally inoculated into various species of animals.

The first account of these researches was given in Berlin in March 1882, and, it need hardly be said, the facts disclosed immediately obtained world-wide publicity. A host of workers in every civilised country promptly set themselves to repeat Koch's observations and experiments, with the result that the views which he had put forward, alike with regard to the cause of tuberculosis and the identity of the disease so named in man and animals, were soon universally accepted. They remained among what were supposed to be the firmly established truths of pathology until July last, when Koch himself surprised the world by casting doubt on at least one of the conclusions put forward by himself in 1882. At the recent British Congress on Tuberculosis he renounced his former opinion regarding the identity of human and bovine tuberculosis, and declared them to be different. It is only fair to observe, however, that Koch himself does not admit that his opinion on this matter has recently been reversed. In his communication to the British Congress on Tuberculosis he says: "Even in my first circumstantial publication on the etiology of tuberculosis I expressed myself regarding the identity of human tuberculosis and bovine tuberculosis with reserve. Proved facts which would have enabled me sharply to distinguish these two forms of the disease were not then at my disposal; but sure proofs of their absolute identity were equally undiscoverable, and I therefore had to leave that question undecided."

Perhaps the best way of showing what were Professor Koch's opinions on this matter in 1882 is to quote from the paper to which he refers. The following is a literal translation of two paragraphs from the paper in question :—

> Tuberculosis of the domesticated animals, and especially bovine tuberculosis, is undoubtedly another source of infection. This fact indicates the position which, in the future, hygiene must take in connection with the danger of the flesh and milk of tuberculous animals. Bovine tuberculosis is identical with human tuberculosis, and is thus a disease transmissible to man. It must therefore be treated like other infectious diseases transmissible from animals to human beings. Be the danger which arises from the consumption of the flesh or milk of tuberculous cattle ever so great or ever so small, it exists, and it must therefore be prevented. It is sufficiently well known that anthrax flesh is often consumed by many persons for a long time without any injurious result, and yet no one concludes therefrom that the traffic in such flesh ought to be permitted.
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> With regard to the milk of tuberculous cows, it is worthy of remark that the extension of the tuberculous process to the mammary glands is not seldom observed by veterinary surgeons, and it is therefore quite possible that in such cases the tuberculous virus may be immediately mixed with the milk.[1]

The above quotation will serve to show to what extent Professor Koch had preserved an open mind regarding the relationship between human and bovine tuberculosis in 1882. The matter is certainly not one of great importance, for the view that the diseases were identical came to be generally adopted not because of Professor Koch's declaration of belief, but because of the facts which he himself had marshalled in support of it.

Professor Koch's present opinion is that "human tuberculosis differs from bovine, and cannot be transmitted to cattle." Here again it is not the opinion but the facts cited in support of it that are important. What are these facts? They relate to certain experiments which Professor Koch, in collaboration with Professor Schütz, has carried out during the past two years. The experiments consisted in testing comparatively the effects of the tubercle bacilli found in human tuberculosis with those produced by the bacilli of the bovine disease when employed to infect the domesticated animals, and notably cattle. In this way a very striking difference between the human and the bovine bacilli was brought to light, for whereas the former invariably failed to infect cattle, and only exceptionally infected swine, the latter always proved highly virulent for cattle and all the other domesticated animals on which they were tried.

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[1] *Berliner klinische Wochenschrift*, 1882, p. 230.

In support of the conclusion based on these results, Professor Koch cited a number of similar experiments previously carried out by others—experiments in which there has also been observed a remarkable difference of virulence between human and bovine bacilli.

Such are the new facts relied upon to prove that human and bovine tuberculosis are not identical diseases. As a matter of fact, the whole of this evidence is not new, for some of these experiments had been completed and published years ago, and were well known to many pathologists; although even the authors of them had not claimed that they proved the non-identity of the human and bovine diseases.

Before weighing this new evidence it must be pointed out that by no means all previous experiments of the same kind have yielded the results obtained by Professor Koch. The statement that human tuberculosis cannot be transmitted to cattle is in conflict with results previously obtained by other experimenters, notably Klebs, Bollinger, Kitt, and Crookshank. Singular to state, even one of the experimenters (Frothingham) mentioned by Professor Koch as having obtained results identical with his own succeeded in infecting cattle with human bacilli. In short, the assertion that human tuberculosis cannot be transmitted to cattle cannot be maintained, except by agreeing to discredit all the recorded experiments in which it is claimed that cattle were thus infected.

For the sake of argument, however, let it be assumed that all the attempts hitherto made have failed to transmit tuberculosis from man to cattle, and then inquire whether this compels one to conclude that bovine and human tuberculosis are distinct diseases.[1]

A cautious person, having this question propounded to him, would probably prepare to answer it by asking another, viz. Is there any known instance in which the same organism or bacterium can cause disease in two different species of animal (A and B), and yet not be readily inoculable in both directions (from A to B and from B to A)? The answer must be in the affirmative. Several instances of this kind are known, but one may suffice. The disease called swine erysipelas, which is the most formidable plague of pigs on the continent of Europe, is caused by a bacillus which may be successfully inoculated from pigs to rabbits, and, by carrying on the disease from rabbit to rabbit by inoculation, it soon becomes intensely virulent for that species. But, as the late M. Pasteur discovered, the bacillus (originally obtained from the pig) which has thus become highly fatal to the rabbit has, in large measure, lost its virulence for swine, and may be inoculated into them without producing any serious effect Applying this to the case of tuberculosis, it would appear to be at least possible that the bacillus of tuberculosis (assuming that there is only one species of that organism) acquires increased virulence for human beings when it passes from man to man but at the same time, in great measure, loses its power of causing disease in the ox. There is no occasion to claim more for the facts relating to swine erysipelas than that they make the suggestion put forward in the previous sentence plausible. At any rate, they leave it quite permissible to keep the mind open regarding the identity of human and bovine tuberculosis, in spite of the experiments cited by Professor Koch.

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[1] If there were also in existence evidence to prove that bovine tuberculosis cannot be transmitted to man, there would, of course, be no escape from the conclusion that the two diseases are different; but, as will presently be shown, Professor Koch himself admits that this latter question is still an open one.

It is to be feared that a good many people who have not had an opportunity to read the paper contributed by Professor Koch to the recent Congress are under the impression that he declared the transmission of tuberculosis from cattle to human beings impossible. This is a great mistake. So far from assuming that the non-transmissibility of the bovine disease to man followed from the experiments showing that the disease could not be transmitted in the opposite direction, Professor Koch drew a clear distinction between the two questions, and explicitly admitted that "the important question whether man is susceptible to bovine tuberculosis is not yet absolutely decided, and will not admit of absolute decision to-day or to-morrow." It is true, however, that he went on to say that, in his opinion, "if such a susceptibility really exists, the infection of human beings is but a very rare occurrence," and that he did "not deem it advisable to take any measures against it."

The evidence which Professor Koch offered in support of the view that the infection of human beings with tubercle bacilli derived from animals is a rare occurrence— so rare that the danger of it may be neglected—was as follows. "If the bacilli of bovine tuberculosis were able to infect human beings, many cases of tuberculosis caused by the consumption of alimenta containing tubercle bacilli could not but occur among the inhabitants of great cities, especially the children. And most medical men believe that this is actually the case. In reality, however, it is not so."[1]

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[1] It will doubtless be noticed that the conclusion which properly belongs to the syllogism contained in this sentence is that the bacilli of bovine tuberculosis are not able to infect human beings, but, as stated above, Professor Koch himself admits that it would be premature to draw this conclusion.

The only cases of human tuberculosis that can by any possibility have been caused by infection through the use of tuberculous meat or milk are those in which the disease begins in the intestines, and "such cases are extremely rare." In one large German hospital only ten cases of the kind were met with in five years; in another there were only sixteen such cases in a total of 3,104 tuberculous children submitted to post-mortem examination; and in a third there was not a single instance of primary intestinal tuberculosis in 933 cases of the disease among children.

Such are the alleged facts from which Professor Koch infers that the risk of infection from meat and milk is so slight that it may be neglected; and it must be admitted that if one's views regarding the frequency of primary intestinal tuberculosis had to be based on the statistics quoted, it would be necessary to concede that the transmission of tuberculosis to human beings by means of meat or milk is an event of great rarity. Unfortunately, however, there are other statistics which place the proportion of cases of primary abdominal tuberculosis much higher. For example, the figures recently published by the pathologists to two of the largest children's hospitals in our own country (in London and Edinburgh) indicate that in over 28 per cent. of the cases examined post-mortem the disease had been started by tubercle bacilli swallowed by the patient.

It will thus be seen that, at least in London and Edinburgh. the criterion selected by Professor Koch by no means proves that infection by the agency of tuberculous meat or milk is an exceedingly rare occurrence. It is right to point out, however, that the statistics quoted from the London and Edinburgh hospitals ought not to be read as proving that 28 per cent. of the children who die in these institutions have been infected with bovine tubercle bacilli, for it is perfectly possible that some, or even the whole, of the cases of primary abdominal tuberculosis had their starting-point in bacilli derived from human consumptives, and swallowed as impurities in food or liquid. The London and Edinburgh statistics merely leave it possible that a not inconsiderable proportion of cases of tuberculosis in children are caused by the consumption of tuberculous meat or milk.

There remain two other points that appear to be deserving of consideration. The absence of any reference to at least one of these in Professor Koch's address to the recent British Congress was a remarkable omission in a discourse that professed to deal with the evidence for and against the view that human and bovine tuberculosis are identical diseases.

It is well known that inoculation is one of the ways by which tuberculosis may be experimentally transmitted; and medical literature also contains examples of the accidental transmission of the disease in this way through wounds inflicted during the post-mortem examination of consumptive human beings. But what is much more interesting in the present connection is the fact that there are on record a considerable number of cases in which it is alleged that tuberculous disease was set up in veterinary surgeons, or others, by the infliction of an accidental wound during the dissection of a tuberculous animal. The late Professor Walley, Principal of the Edinburgh Veterinary College, accidentally inoculated his wrist while dissecting a tuberculous heifer, and the resulting lesion was still unhealed at the time of his death from phthisis more than twenty years afterwards. A German veterinary surgeon, named Moses, similarly inoculated his thumb at the post-mortem of a tuberculous cow, and he eventually died from tuberculosis. In another case recorded in Germany a veterinary surgeon accidentally inoculated his finger with tuberculous matter from an ox, and the lymphatic glands of the same arm became tuberculous, but his life was saved by their surgical removal. One must either refuse credence to these and other recorded cases of the same kind (for reasons which are not obvious), or else admit that bovine tuberculosis is transmissible to man by inoculation, and if by inoculation, possibly also in other ways.

The other point, which appears to have considerable importance as long as the immunity of human beings against bovine tuberculosis has not been absolutely proved, is that a large number of distinct and widely different animal species are known to be susceptible to bovine tuberculosis. Naturally occurring cases of tuberculosis are met with in every one of the common domesticated species—horses, pigs, dogs, cats, sheep, and goats, as well as in cattle—and bovine tuberculosis is readily transmitted by experiment to all these, and to a large number of other animals. It is, of course, possible that man may be an exception; but it is a remarkable fact that in the whole range of pathology there is not known a single instance of a disease that is common to three of the domesticated species, and yet does not attack man.

The purpose of this article has now been achieved, and those who read it may judge for themselves how far the evidence recently brought forward by Professor Koch is sufficient to overthrow his own earlier conclusions regarding the relationship between human and bovine tuberculosis.

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THE EDUCATION OF THE YOUNG FARMER.

In these days of low agricultural prices and in face of the tremendous foreign competition with which the English farmer has to cope, the need of a training which will enable him to make the best of the farm has become most pressing for the young farmer. This subject has of late years secured a large amount of attention abroad, with the result that in a great many countries there is now a most complete system by means of which young agriculturists are trained in all the latest and most approved methods of growing and marketing the important farm produce of their country. In Denmark, Canada, and Australasia the consequence has been to revolutionise agricultural practice and to enormously increase the returns to the farmer from his produce.

A great deal has already been done in England, but it cannot be said that as yet a real hold has been secured on the farmer's son.

Up to about twelve years ago, the best of agricultural education in England was largely confined to the Royal Agricultural College at Cirencester and the Downton College of Agriculture at Salisbury; and the students of these colleges consisted principally of the sons of landowners and land agents. The Science and Art Department also encouraged evening classes throughout the country at which instruction was given in the "Principles of Agriculture;" but as a rule, the subject was taught in such a way that the young farmers who attended the classes generally failed to find them either interesting or instructive, and, so far as practical farming was concerned, of no value. The teachers had seldom any knowledge of agriculture, and therefore could not grapple with the difficulties that the young farmers wished to surmount by taking a course of instruction in scientific agriculture. The failure of these classes has done a great deal to create the strong prejudice which the average English farmer has formed against scientific instruction.

The Treasury, in 1888, made a grant of 5,000*l.*, which was to be given annually in aid of agricultural and dairy instruction. The management of this grant soon passed into the hands of the Board of Agriculture, created in 1889, and the sum thus available for general grants in aid of educational institutions has gradually increased to a total of 7,850*l.*, the amount expended by the Board for the year 1900–1901, which is exclusive of the costs of inspection, and of other small grants for special experimental purposes. The Board of Agriculture has thus been largely responsible for calling into existence the agricultural departments of the colleges at Bangor, Aberystwyth, Leeds, Newcastle, Nottingham, and Reading. The agricultural departments of the University of Cambridge and the South Eastern Agricultural College at Wye are also assisted and subsidised by the Board.

But a much greater expansion of the facilities for special agricultural instruction was brought about by the funds placed at the disposal of the County Councils by the Local Taxation (Customs and Excise) Act, 1890, for the purposes of technical instruction. In his recent Report on the Grants for Agricultural Education and Research, Major Craigie estimates that the sum thus devoted by the County Councils in England and Wales for the year 1899–1900 was roughly something like 77,000*l.*, and that, including the grants distributed by the Board of Agriculture and the payments made by the Board of Education for instruction in the principles of Agriculture under the scheme of the Science and Art Directory, the total amount of public money in England and Wales applied annually for the purposes of agricultural education is between 85,000*l.* and 90,000*l.*[1]

By means of the different agencies referred to, all kinds of agricultural instruction have been provided, and a large amount of demonstration work has been done, principally with the object of showing to farmers on or near their own farms the results of recent scientific investigations. All this work has met with a considerable amount of success. We find, for instance, that the average farmer now knows much better what manures to purchase for his different crops and how to apply them. There is also a greater knowledge of the best methods of feeding farm live-stock, while dairy work and poultry keeping are on the whole being carried out in a much better way than formerly. Most important of all, the agricultural classes in the various colleges are gradually increasing in size, and, as a result, the number of well-trained agriculturists in the country must be on the increase.

Unfortunately, however, it has to be observed that all this is not giving us any considerable increase of trained farmers, and an inquiry as to the reason is desirable.

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[1] Annual Report on the Distribution of Grants for Agricultural Education and Research, 1900–1901. [Cd. 814.]

In the first place, a considerable number of agricultural teachers and experts have, in late years, been required both in this country and abroad, the result being that many young men who fully intended to be farmers when they commenced their training, have been induced to accept posts of this character. Secondly, attendance for two or more years at college classes has a tendency to wean a young man from a life on the farm, and to make him more likely to accept a good position not wholly connected with agriculture. Thirdly, those who have taken such courses and are now actually farming, complain as a rule that the agricultural courses of instruction available in this country are not so well suited as they should be for the training of the practical farmer. Lastly, only a very small proportion of our English farmers' sons have been induced to take a course of instruction in agriculture.

It may be well to consider why the young English farmer has not taken advantage of these courses of instruction. There is the farmer's prejudice, with a certain amount of reason, against scientific teaching, as well as a common unsuitability of the courses of instruction. Nor has the necessity for a thorough rousing on educational matters been as yet recognised by the agricultural classes. Many of our County Councils have again and again offered scholarships or exhibitions, which would cover tuition fees and board while taking such courses, but in many cases no applications have been received, and the scholarships have been allowed to lapse simply from the lack of candidates. This is not as it should be; the scholarships should be looked upon as among the principal agricultural prizes of the county which offers them, and should be considered as a mark of distinction for life by the successful candidates. I wish here to express my opinion that the scholarships should be open for competition to any candidate, whatever the social or financial position of his family; for there has been a tendency to discourage well-to-do candidates from competing, with the result that many have hesitated to do so because of restrictions of this kind, either implied or stated.

It is evident that the instruction of the farmer's son throughout should be of such a character that it will not only give him a good elementary education, but qualify him as far as possible for the management of his farm on sound business principles.

The first qualification of the successful farmer is that he must be a good business man, and a thorough business training should therefore be aimed at. Put in a concise form, the essentials seem to be :—

1. A good elementary education until the boy is twelve or thirteen years old, and until this time no training is better than that required to pass the fifth or, if possible, the sixth standard at an elementary school. If the boy is sent to a private or any other school until he reaches this age, such a training should be insisted on as well as a test by examination.

2. From twelve to fifteen, or possibly sixteen years of age, the best course is to send the boy to a really good secondary school; where he should receive with a good general training, special teaching on the commercial side, including bookkeeping, and in addition a good grounding in elementary science. The teaching at this stage should not be applied to any great extent to agriculture itself; but the scientific teaching should, as far as possible, be illustrated by familiar objects on the farm, such as the characteristics of farm crops and plants, and the habits of farm live-stock, birds and vermin. Some knowledge of common insects and their habits and of elementary physics and chemistry should also be imparted, these subjects being as far as possible accompanied by simple and interesting illustrations of common farm phenomena.

There are numerous secondary schools throughout England which have been remodelled upon previously existing foundations—many of them also subsidised by County Councils—that are in a position to provide a really good training and to impart instruction well suited to a farmer's son at this stage of his education.

It is absolutely essential for success, however, that the head master of such a school should be in sympathy with the farmer and his calling, and should fully recognise the character of the teaching required. It is disastrous to the education of the boy if, during this time, he is crammed to pass certain examinations for which grants are received and which do not directly lead to the object in view.

3. The boy should now return to the farm for one or possibly two years. During this time he should acquire facility in all practical work on the farm, he should become familiar with the management of a horse at all kinds of farm work, and he should have some practice at ploughing, mowing, stacking, thatching, milking, and similar operations. On his father's farm he cannot be under the same discipline as at a school; and it is therefore strongly advisable that he should report on all this work to an outside authority—for instance, to the professor of agriculture at the college where he will take

the course described later. This is in many ways the most important part of the boy's education, as at no period in his life will the farm be more interesting to him, especially if his previous training helps him to appreciate all that is taking place on the farm.

At this period of his career it is essential that he should not be disheartened by getting too much of the hard work of the farm: in other words, the object should be not the completion of the work, but the training of the boy. If he has been intelligently instructed in subjects like the natural history of the farm, his work will be far more interesting. This is the age at which the boy is most hopeful as to his future as a farmer. In fact, there is no greater treat, when one has the opportunity of walking over a farm, than to secure as guide the farmer's son at this age. Going round the buildings and land with him, and discussing the merits of the live-stock, one shares his enthusiasm, and carries away when the visit is over a vivid impression of the inner life of the farm.

The practice on some English farms of receiving pupils for practical training does not, on the whole, give good results, the reason being that in many cases the pupils are not trained in practical work, simply because they prefer to ride or shoot, or otherwise enjoy themselves, and, if they pay a sufficiently high premium, the farmer has no pecuniary object in making them work. Further, it has become customary to send the young English "ne'er-do-wells" to a farm as a last resource, and these, in many instances, do great harm to those with whom they associate. No pupil should be put on a farm at a high premium, but rather on the understanding that his work shall partly pay for his keep.

A farmer is seldom a disciplinarian, and I repeat that there should be some authority to whom regular reports on the farm work should be sent by the pupil. The feeling among the best Canadian agriculturists is very strong against paying premiums at all. They urge that in Canada farm labour is always valuable, and that a man who is willing to work should be worth his keep. On the other hand, they do not wish to have "loafers" on their farms, and such they have found many pupils to be who have come to them willing to pay premiums. In the course of a visit to Canada last summer, I realised how strong the feeling is against "loafer" pupils, who are too well off to throw themselves into the manual work of a farm, proficiency in which is essential for their success. Such pupils almost invariably succeed only when their remittances are cut off, and they are obliged to work to earn for themselves a living.

I wish to emphasise strongly the importance of a farm training between the ages of sixteen and eighteen, when the mind is most receptive. If left till a later period, very valuable time is lost, and the practical work is not entered upon with the same zeal and enthusiasm. I am firmly convinced that a great deal of the American "go" is attributable to the fact that when a young American decides to be an engineer, or a farmer, or to follow any similar calling, he is put to the practical work at this age, and is not allowed to spend the time between sixteen and twenty, and even over this, leisurely discussing with every one what he had better take up as his life's work, and aimlessly attending some school or following some course which it is more than likely is anything but fitted to prepare him for the career he will ultimately decide upon.

4. The lad, having now acquired a knowledge of and familiarity with farm operations, cannot do better than devote one or two winters to a really practical course of instruction at a college. He should spend the summer months of the year on the farm, which, as a rule, are the most important for the practical work. It is desirable that during this time the student should be kept fully in touch with the farm, as in this way he recognises more fully the advantages of his college training and can the more readily solve the problems of the farm by the application of the teaching which he receives.

The college teaching which is most likely to be of the greatest service to the young farmer should be somewhat on the lines of the following syllabus:—

(*a*) *Soils and Manures.*—Classification of soils: clay, loam, sand, marl, chalk, peat; variation in fertility, and suitability for different crops. Drainage of soils. Indications of fertility. Variation in climatic conditions. Suitability of different soils and districts for cropping and pasture. Sheep farming. Dairy farming and rearing of live-stock. Cultivation of soils, such as ploughing, sub-soiling, fallowing, and autumn cultivation. Lime, chalk, and marl. Farmyard manure: its production, composition, and variation in character and value; its application to crops. Artificial manures: nitrate of soda, sulphate of ammonia, bones, dissolved bones, superphosphate, basic slag, kainit and other potash manures. The choice, purchase, and application of manures.

(*b*) *Crops and Pasture.*—The cultivation and management of wheat, barley, and oats; of beans and peas; of cabbages, mangels, turnips, and swedes; of rape and mustard; of sainfoin and lucerne; and of temporary leys for hay and pasture. Management of pasture and meadow land, and the laying down of land to permanent pasture.

(*c*) *Live-stock*—The principal breeds of horses, cattle, sheep, and pigs; their care and management. The suitability of the various breeds for different districts. Stud, herd, and flock books.

(*d*) *Foods and Feeding-stuffs.*—Feeding of horses, cattle, sheep, and pigs at different ages and under different conditions. Rations for different classes of stock. The economical use of home-grown and purchased foods. Relation of food and manure.

(*e*) *Hygiene of Farm Animals.*—The general conditions of health. Sanitation of farm buildings. Management of the mare, cow, ewe, and sow in breeding and producing young. Dentition and its indications of age. The management of farm live-stock in health and disease.

(*f*) *Insect Pests and Plant Diseases.*—The common animal parasites, insect pests and plant diseases, and methods of dealing with their attacks on animals and on crops.

(*g*) *Farm Bookkeeping.*—Farm account books, and how they should be kept. Valuations: tillage, farm stock, and effects.

(*h*) *Mensuration and Surveying.*—Measurement of stacks and ricks, and of heaps of manure, roots, stones, or other material. Measurement of timber. Chain surveying.

The course should also include some instruction in elementary science with its bearings on farm practice, as well as some lectures on the agricultural imports of this country and the prices of agricultural produce. No subject will assist the young farmer more than that of agricultural geography, some lectures on which treating of the agricultural produce and capabilities of different countries and the possibilities of these countries in the future might well be given. The young farmer should be able to study the farm markets of the world, so that he may not only know how to grow the best and largest amount of produce, but also have a fair idea of what kind of produce is likely to give the best return

A thorough knowledge of elementary bookkeeping is of the greatest importance to the young farmer, so that he may be able to record accurately and methodically his business transactions. He should also be familiar with the meaning of commercial terms in common use, and with the weights, measures, and currency of countries which send large quantities of agricultural produce to England.

This commercial side of the farmer's training is, after all, the most important. When we talk closely to our most successful farmers and gain their confidences, we cannot but recognise that it is their business qualifications which have brought them to the front. Very great harm has been done in the past to the cause of agricultural education by insisting that scientific teaching was of the greatest importance, and in many cases this has been taught only, while the most valuable part of the training has been excluded. It is all-important to the farmer that he should be able to buy and sell to the greatest advantage, and also to decide, not only what kind of produce will suit the farm best, but also what will find the best market in the district in which the farm is situated.

5. If the young farmer means to give attention to dairy farming or poultry keeping, he should now undergo a short course of instruction in one or other of these branches, or, if he

is to be a specialist, a longer course would be required. If, however, general farming is his object, he would find it immensely to his advantage to spend a year on a really good farm of the type on which he is likely to settle afterwards, and with somewhat the same conditions of soil and climate. During this year he should make himself conversant with agricultural experimental work throughout the country and give some attention to similar work abroad. He should also further familiarise himself with our agricultural imports, their value, and their means of transport from various countries.

By this time the young farmer should be fairly well equipped for the business of his life, especially if he have kept steadily in view throughout his course of instruction the kind of farming in which he ultimately means to engage. No question will be likely to give him more trouble than that of labour, and it is essential for future success that the farmer of moderate means should be his own foreman, a good organiser of labour, and able to exercise that tact and kindly sympathy which help so much to bind good men to their employers. Further, while not spending money on superfluous implements, he should be ready to employ labour-saving machinery and to use sound judgment in its purchase.

I have endeavoured in the foregoing to outline a course of training which is at present accessible, and which need not be costly. The farmer's son who means to make himself useful will be easily worth his keep during the one or two years after leaving school and during the intervals of his college study, while, for his final year's experience on a farm, he may be able to arrange mutual terms. For the one or two winters which he spends at a college, the cost will probably not exceed 30*l.* for each winter with the addition of his books, clothing, and pocket money. The County Councils of Berks, Bucks, Dorset, Hants and Oxford, all offer exhibitions, tenable for such courses of study. The examination on which these are awarded comprise simple school subjects, and require some knowledge of practical agriculture. Similar exhibitions are offered by many other County Councils, and I think it would not be difficult to persuade most of our English County Councils to provide equal facilities.

In my Canadian tour I was greatly interested in meeting many past agricultural students of the Ontario Agricultural College who now occupy prominent positions as agriculturists in the Dominion. By the courtesy of Dr. Mills, the President of the College, I had the opportunity of seeing fully into its working, and I found that one of the essential conditions of entry was that students must be familiar with practical work on the farm. I was told that before this rule was brought into operation the results were not nearly so satisfactory as they now are, and also that the large number of students at the college are mostly farmers' sons of the best type.

This is the result that must be secured at our English centres of agricultural education, for it cannot be said that it is now the case. Meanwhile, agricultural education cannot exert its proper influence upon English farming, and it is therefore a duty to do all that is possible to bring about so desirable an end. If pursued in the right way, so that the full co-operation of the farmers of the country is secured, the accomplishment of this ideal should not be impossible.

It must be clearly understood that I have had in view in this article only the training of the young farmer. I have endeavoured to outline a course of study which will enable him to retain all his liking for the farm and at the same time give him a fairly complete training, and I wish to reiterate that it is essential to keep him in touch with the land during his whole course of training. At the same time it must be remembered that any such training is not complete until after years of ripened experience, which after all is the basis of the success of our best-known English farmers.

The scientific agriculturist who is to become a teacher or a specialist in his calling must undergo a sound course of scientific instruction. At the same time he must have a thorough practical knowledge of agriculture if he is to be a sound and reliable expert or teacher, capable of gaining the confidence of the farmers with whom he comes in contact.

DOUGLAS A. GILCHRIST.

Reading College.

THE HOP AND ITS ENGLISH VARIETIES.

ALTHOUGH many excellent papers have appeared from time to time in the pages of the Journal upon the cultivation and management of the Hop, none have more than briefly referred to the structure or varieties of the plant. With the object of supplying this deficiency the present article has been written, and it is hoped that the illustrations which accompany it may be of permanent value as a record of the character of the varieties at present in cultivation in England.

THE STRUCTURE OF THE HOP.

Only two distinct species of hops are known. One of these, the Japanese hop (*Humulus japonicus*, Sieb. et Zucc.), belongs to China and Japan; the other, our ordinary hop (*Humulus lupulus*, L.), is a native wild plant distributed all over Europe. The Japanese hop is of no value for brewing purposes, but is grown sometimes as an ornamental climber in gardens. The common hop is cultivated for its fruits, which are technically known as strobiles. A strobile somewhat resembles a fir-cone, and consists of a stem or axis (called the hop "strig" in Kent), with a number of short branches arranged alternately along its opposite sides, as in B, fig. 1, on page 68.[1]

Upon each of these branches grow four leaf-like structures termed bracteoles (*b*, fig. 1), which carry at their bases the "seeds" of the plant. In addition to these seed-bearing bracteoles are a series of similar-looking leaves which do not bear "seeds;" they grow in pairs on the main axis or "strig" of the hop, just beneath the short branches.

The "seedless" leaves are termed stipular bracts (*sb*, fig. 1); these and the "seedy" bracteoles are erroneously but conveniently called the "petals" of the hop by growers. The two sorts of "petals" differ from each other in shape, and to some extent in colour also. the seedless "petals" being usually darker, and often tinged with a dirty green hue. In the poorer kinds of hop this disfigurement is most conspicuous, but in the better classes it is liable to appear on some soils, especially if the plants are heavily dunged or treated too liberally with nitrogenous manures.

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[1] Figs. 1, 2 and 3 are borrowed from the author's *Agricultural Botany*, by permission of Messrs. Duckworth & Co.

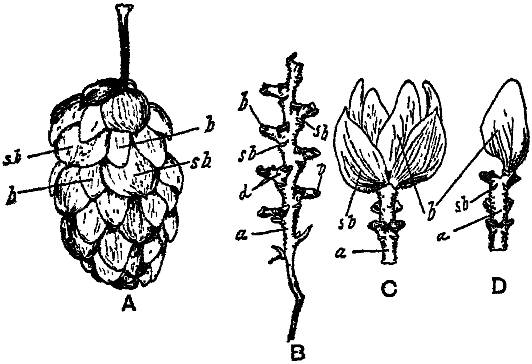

FIG. 1.—A, Hop strobile or female inflorescence. *sb*, "Stipular bract"; *b*, bracteole. B, Axis of the strobile (the "strig"). *a*, The main axis; *d*, the cymose branches of the axis on which the female flowers are borne; *sb*, point of insertion of "stipular bract"; *b*, point where bracteoles are attached (see D). C. Piece of axis of the strobile, showing the disposition of the "stipular bracts" *sb* and the bracteoles *b*. D, Same as C, with the stipular bracts and one bracteole removed.

Upon the "seed" and seed-bearing "petals," and also to a slight extent on the seedless "petals" of the best hops, are seen a number of very small round particles, rich amber-yellow in colour. These are the lupulin glands—the so-called "condition"—the character and amount of which are the chief factors determining the brewing value of the hop. Each gland is hollow (fig. 2), and contains within it a mixture of oil and resinous material, upon which depend the peculiar aroma and flavour of the hop. To the resinous substances of the glands is also due the preserving power or keeping quality which the hop exercises when added to beer.

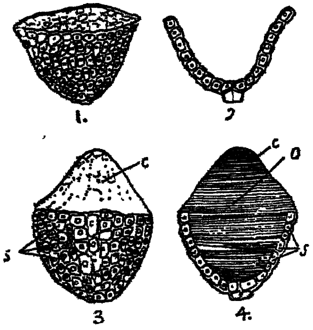

FIG. 2.—Lupulin Gland of the Hop (magnified).

1. On very young hops in "burr" stage. 2. Vertical section of 1. 3. Fully-developed gland. *s*, Secretory cells; *c*, cuticle. 4. Vertical section of 3. *s*, Secretory cells; *c*, cuticle; *o*, cavity filled with resin and oily contents.

During the growth of the hop the lupulin glands increase in size, and, as the hop ripens, the colour of the oily contents changes from a transparent clear amber-yellow to an opaque citron or lemon-yellow tint, the perfectly ripe glands appearing like fine round particles of sulphur.

The occurrence of this change is the best indication of the ripeness of a hop. Usually for want of labour, oast-room, and other matters, picking is commenced before the hops are ripe, but whenever possible they should be allowed to hang until a few opaque glands are seen distributed here and there among the transparent ones on the "petals:" these can be readily examined with a small magnifying glass.

A good hop, from both the grower's and the brewer's point of view, should have, as far as possible, the following characters:—

(*a*) The yield should be large, and the hops should be capable of hanging on the plant without damage for some time, so as to allow a considerable area to be picked and managed with a moderate number of hands.

The time which a hop will remain in good condition without "going off" depends upon the manuring, season, and locality to some extent, but there are constitutional differences among hops in respect of this quality. Fuggle's hops, for example, usually hang well, while the thinner-petalled varieties are easily discoloured and fall in pieces when left a few days in the picking season.

(*b*) The plants should be hardy and highly resistant to the attacks of fungi and aphides.

Unfortunately, delicacy and weakness are almost invariably met with among hops of the best quality.

(*c*) The brewer aims at high lupulin-content, for the chief use of the hops to him depends upon the amount of resins present in them. Moreover, for the process of dry-hopping, a pleasant aroma is essential.

So far as the keeping quality of the beer is concerned, and also to a large extent the peculiar bitterness imparted to the liquor by the hop, a sample of good resin-content, with only a passable or even poor aroma, is as useful as one of fine aroma, or the hops of the Weald or less favoured districts would never be grown. However, to impart the most delicate and attractive flavour to beer, only hops of the best quality can be employed.

The size of the resin-glands, their weight, and the number on each "petal" are generally greatest among hops of poor aroma; but their weight, compared with the rest of the hop, is often higher in the best quality hops than in those of poor aroma and flavour.

In a good brewer's hop the petals should be well covered at the base with lupulin, and the "strig," "petals," and "seeds" should weigh as little as possible.

(*d*) Hops with the most delicate aroma possess thin, smooth, pale-golden "petals," the bracteoles being well rounded at the tip, and the stipular bracts similar in colour and texture and broadly oval in shape (3 and 4, fig. 3).

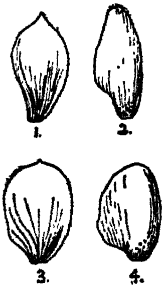

FIG. 3.—1. "Stipular bract." 2. Bracteole of Fuggle's Hop. 3 and 4. The same of Bramling Hop.

Those of poor aroma have "petals" which are generally rough, thick, and puckered. The bracteoles are more pointed, as in 1 and 2, fig. 3, the stipular bracts being narrow and often a darker green tint than the bracteoles, so that the colour of the hop is not uniform all over, and cannot be made so even by the strongest application of sulphur on the kiln. The worst varieties have the small stipular bracts at the base of the strobile twisted.

Some varieties of hops have exceptionally pale, straw-coloured "petals," which are very thin; such are always deficient in resin-glands, but the aroma is generally good.

English Varieties of Hops.

The seedlings of few plants vary so much as those of the hop, and this in spite of the fact that it is a species which has not been subject to hybridisation.

From seeds of the best Whitebine variety originate plants having red, dark-green, or pale-green bines, either rough or smooth, and scarcely two plants in the same batch of seedlings are alike in earliness, lupulin-content, or shape of the hop.

This natural variability was well known to the early growers, and many of them mention the futility of raising a garden of hops from seeds.

Walter Blith, in his "English Improver" (1653 edition), says that in ordinary hop gardens some plants ripen much earlier than others, and these should be looked for and picked separately. Afterwards growers selected and planted out these early plants in separate parts of the gardens, so as to avoid irregular picking.

In the "Whole Art of Husbandry" (1712 edition), Mortimer mentions four varieties, namely:—(1) the Wild Garlick Hop; (2) the Long Square Garlick Hop; (3) the Long White, and (4) the Oval Hop. In the same treatise a "Kentish Gentleman" adds an "Account of Hops" and mentions three sorts—two Whitebine varieties, one tender and a little earlier than the other, and a hardy Greybine variety bearing long, square, late hops. In the eighteenth century several varieties were grown, mainly distinguished by local names, as well as the "Flemish hop," a Redbined variety, bearing small, close-set hops of a greenish colour.

The latter kind always carried a crop even in a blighted season, but its quality was poor. During the nineteenth century several new varieties were introduced.

Below I have attempted to describe the chief characters of the hops most generally grown in this country at the beginning of the twentieth century. As far as possible, I have endeavoured to state what is known about their origin, in the hope that it may be of interest to growers and at the same time be of service as a record that may save future workers much trouble.

Although the amount of resin or lupulin and the flavour which the hop possesses vary with the season and soil very considerably, the shape of the "petals," their thickness and character of the veins upon them, are very constant, as is also the compactness of the hop, as measured by the number of short branches per inch of "strig." In the descriptions, I have used the term "density" to express compactness of the hop, the figures 5, 6, 7, or 8 after the word denoting the number of short branches to which the "petals" are attached on each three-quarters of an inch length of "strig." (See B, Fig. 1.)

The "density" of a hop, taken in conjunction with the shape of its bracts, is the best means for distinguishing and classifying the different varieties.

A. EARLY VARIETIES.

Hobbs' Early (density = 6).—A long, narrow, pointed hop, nearly allied in botanical characters to the Prolific, but with a green bine. It is rather smaller than the Prolific hop, somewhat earlier in ripening and of slightly better quality, though it belongs to the thick-petalled, coarse varieties. Its origin I have not been able to determine with certainty. (Fig. 4, page 72.)

Prolific (density about 6).—One of the largest hops grown, but of poor quality, coarse in petal, pointed, square in section and poor in flavour. The colour of the hop inclines to an orange tint when ripe, with dirty green twisted bracts at its base. The bine is red and short, and for its size bears a very large crop. It is only grown in districts unsuited to the better kinds of hop, and was raised in 1852 from a plant selected from a garden of Old Jones' hops by Mr. Thomas Guest of Chill Mill Farm, Brenchley, in Kent. (Letter from Mr. Guest's son, November 8, 1899.) (Fig. 5, page 73.)

Meopham (density = 5).—A large, coarse, loosely constructed hop, of poor flavour, with little lupulin. The bine is red, and, like the Prolific, it is only grown as an early variety in the poorest districts.

Henham's Jones' Hop (density = 7).—Frequently the coarse

Meopham hops are known by this name in certain districts. The true Henham's Jones' variety is, however, a much better

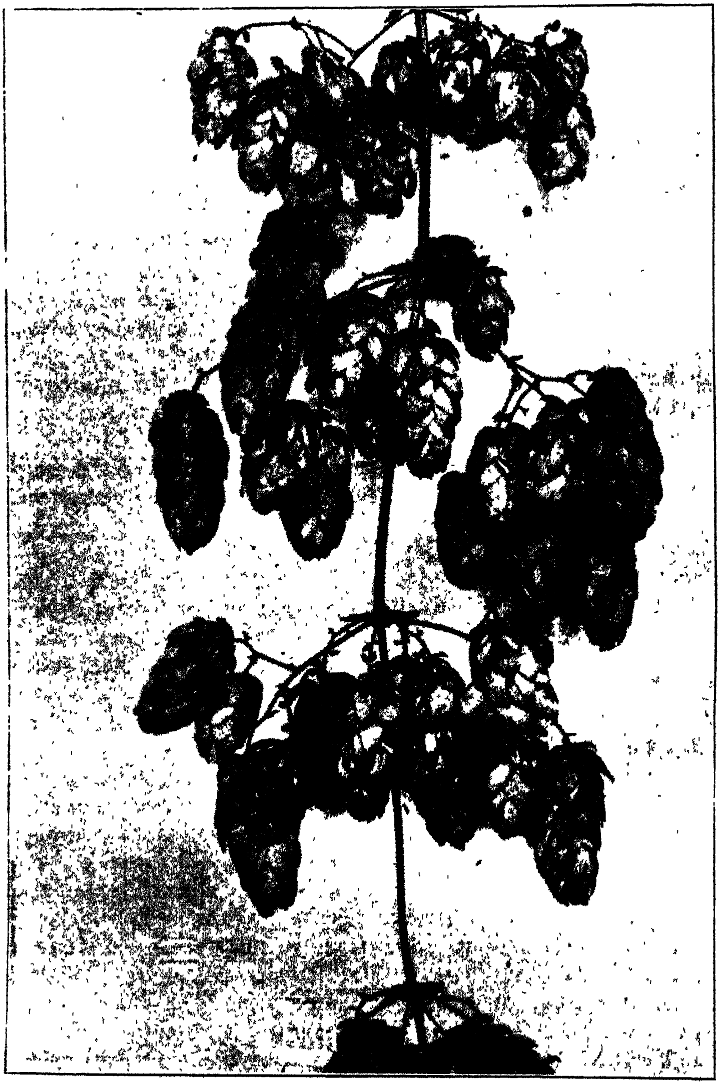

FIG. 4.—Hobbs' Early Hop. (See page 71.)

kind, of pretty golden colour, oval, of medium size and with thin petals. (See fig. 6, page 74.) The lupulin-content is somewhat low, but the flavour is good. The bine is red and comparatively thin.

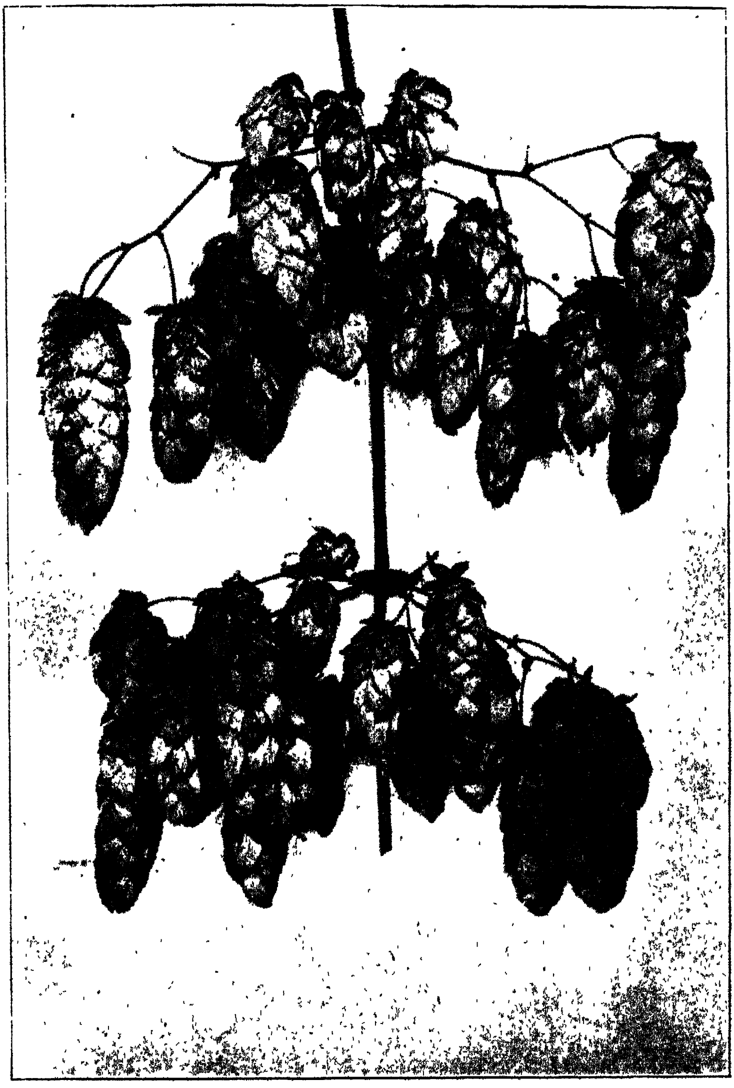

FIG. 5.—Prolific Hop. (See page 71.)

It was raised by Mr. Iden Henham of East Peckham, Kent. (Letters from Mr. E. A. White, Paddock Wood, and others.)

Bramling (density = 7).—A reddish-bined early hop of good quality, and grown in all the best hop districts. The hops are of medium size, firm, compact, and round in section, with a well-closed tip. (See fig. 7, page 75.)

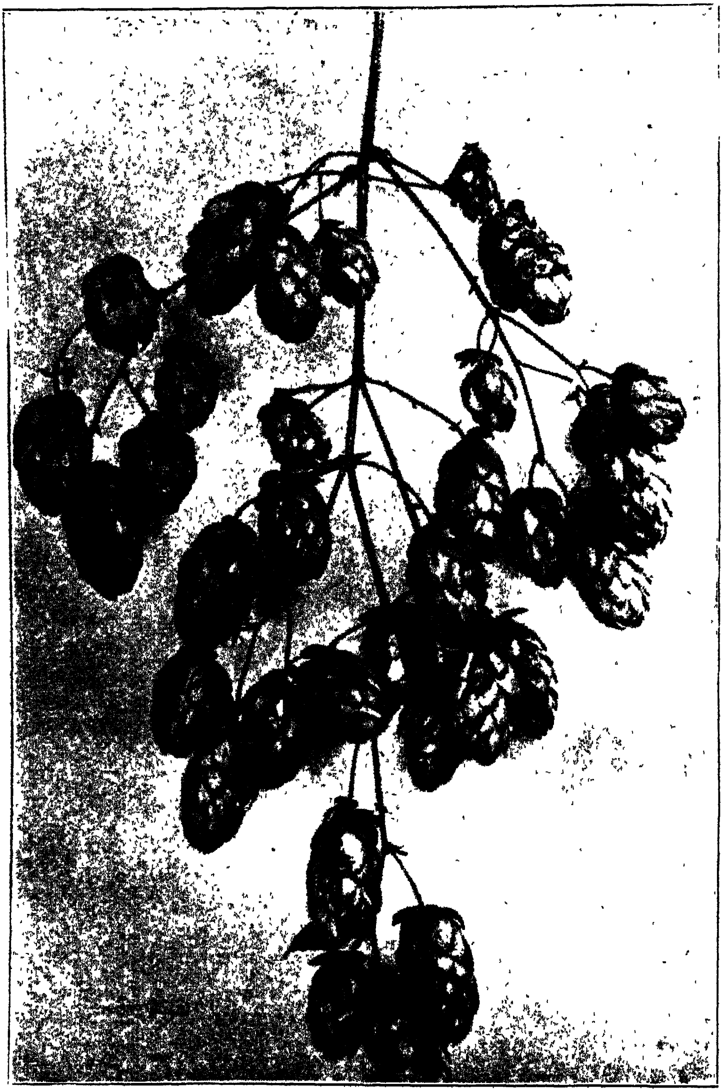

FIG. 6.—Henham's Jones' Hop. (See page 72.)

It was selected by a farm bailiff named Smith, on Mr. Musgrave Hilton's farm at Bramling, a hamlet in the parish of Ickham, near Canterbury. It was originally named Hilton's Early Bramling hop, and first became known and extensively

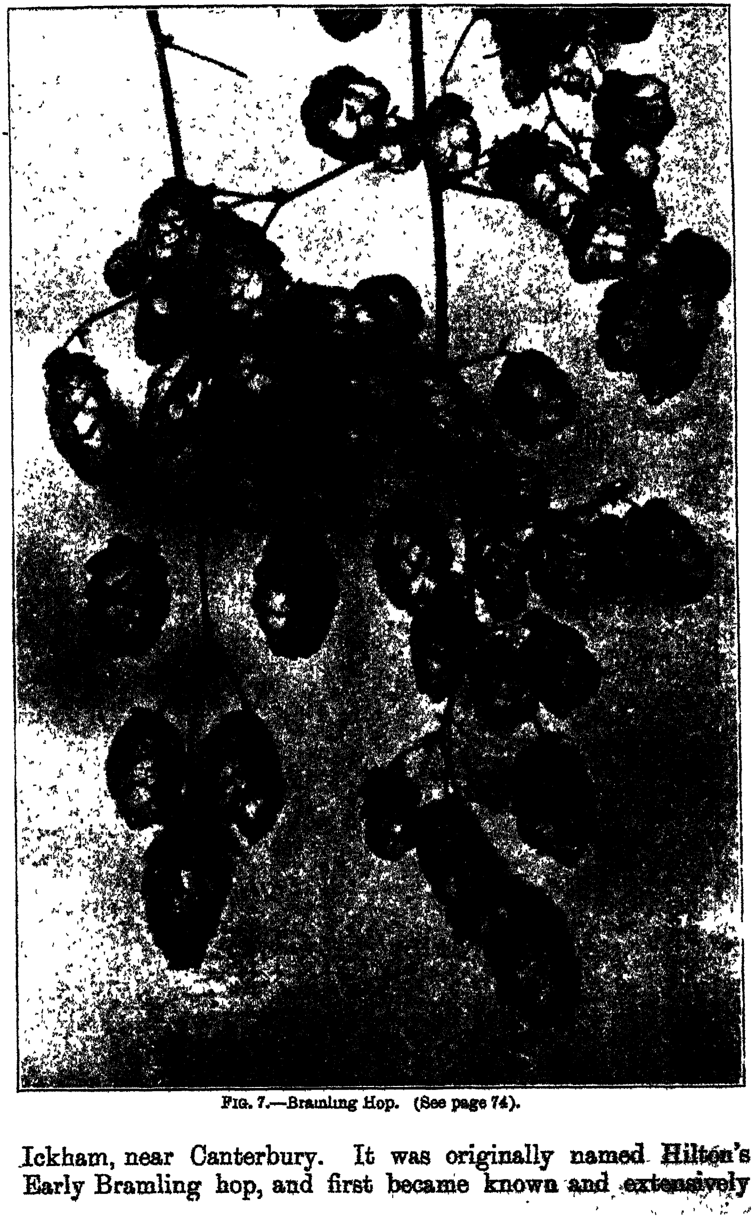

FIG. 7.—Bramling Hop. (See page 74).

planted about 1865. (Letters from Mr. W. H. Hammond, Milton Chapel, Canterbury, and Mr. J. D. Maxted, Littlebourne, Dover.)

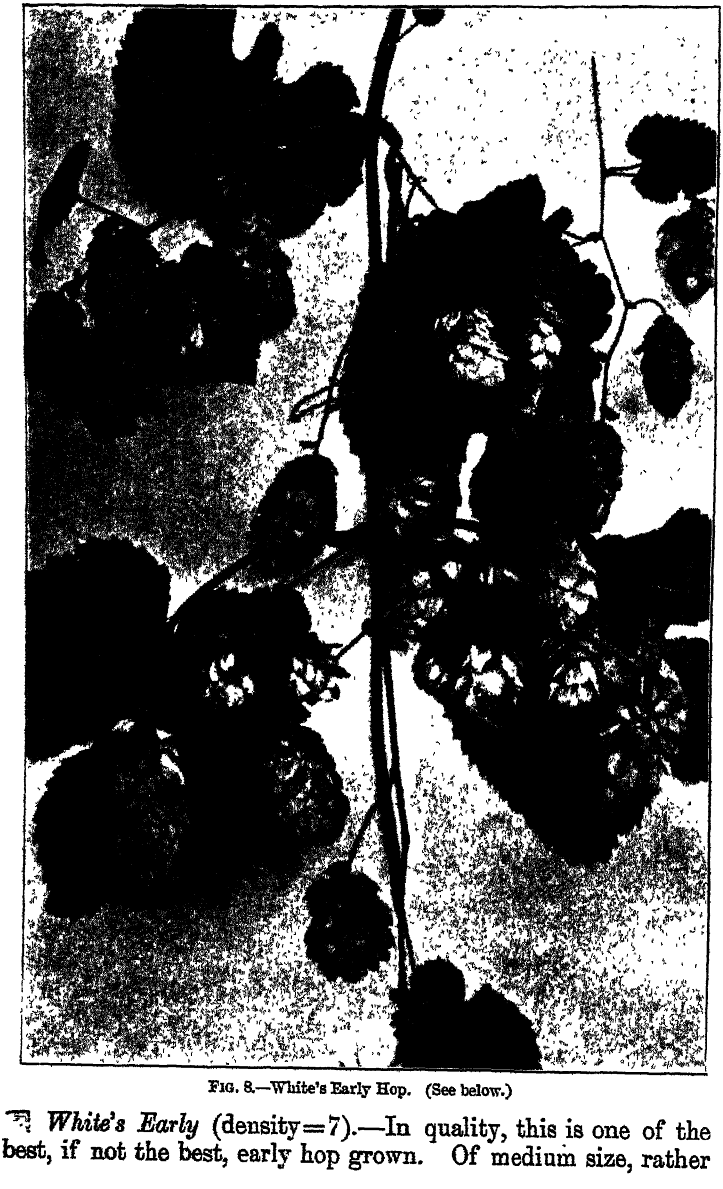

FIG. 8.—White's Early Hop. (See below.)

White's Early (density=7).—In quality, this is one of the best, if not the best, early hop grown. Of medium size, rather thin in petal, and of a beautiful pale-golden colour and excellent flavour. It closely resembles the Canterbury Whitebine variety, but is peculiar in having the petals loose and open at the tip. The bine is pale green; the plants are delicate, and rarely give a satisfactory crop. (Fig. 8, page 76.)

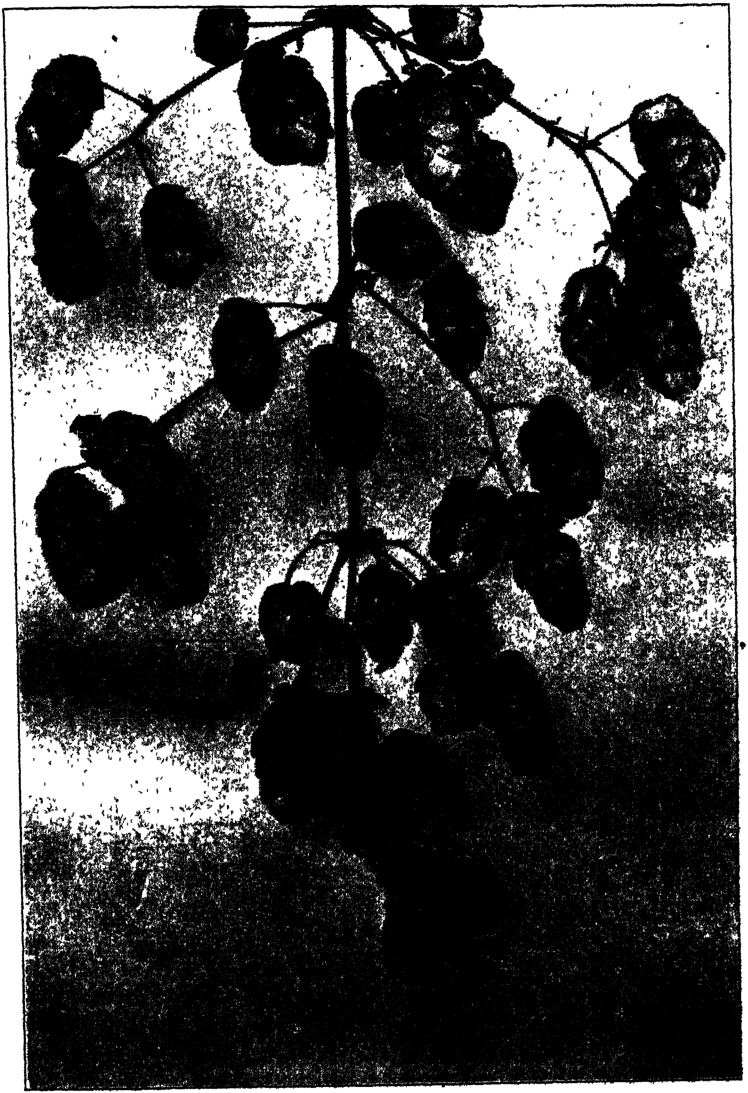

Fig. 9.—Amos's Early Bird. (See page 78.)

This variety was introduced by Mr. George White of Grove House, Hunton, near Maidstone, about the year 1852.

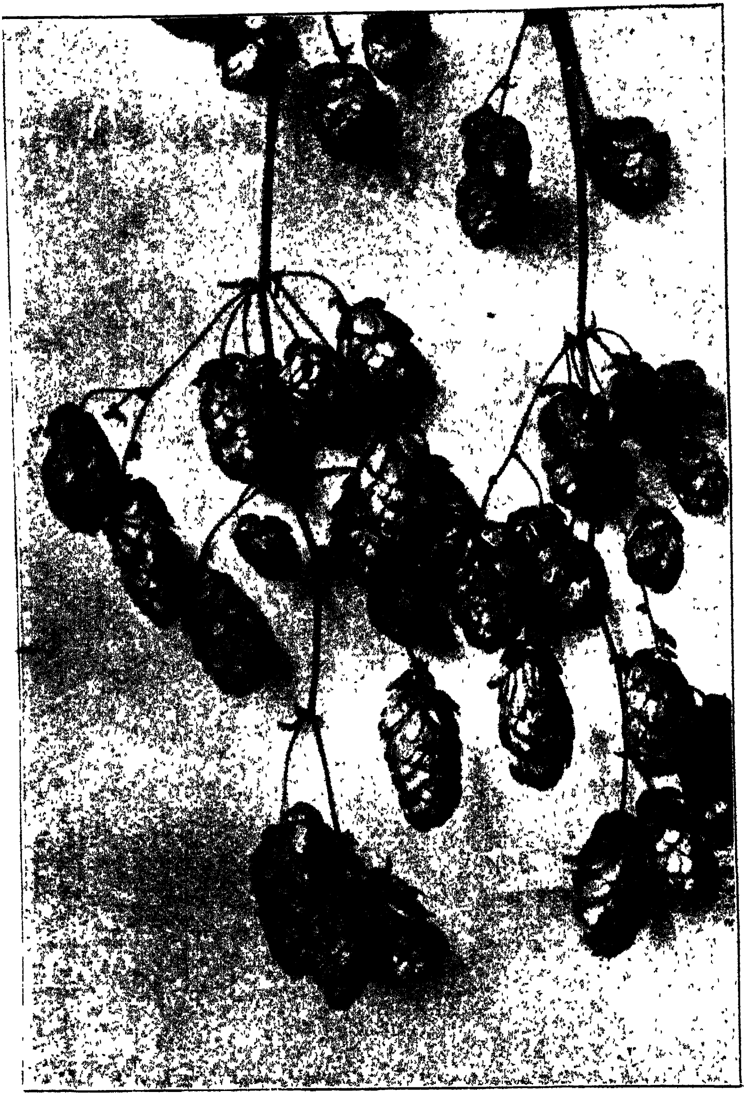

FIG. 10.—Bennett's Early Seedling Hop. (See page 78.)

It was raised from a plant which had been noticed to grow very early hops for two or three successive years in an old Canterbury Whitebine garden. (Letter from Mr. G. White, November 1899.)

Amos's Early Bird (density about 8).—A densely constructed hop, closely allied to the Bramling in shape and colour, but usually earlier than this variety. It is of good quality, and takes high rank among the best early varieties for cultivation in good districts. (Fig. 9, page 77.)

It was discovered by Mr. Alfred Amos, Spring Grove, Wye, Kent, in 1887, in his garden of Bramling hops. (Letter from Mr. Alfred Amos, November 1889.)

Bennett's Early Seedling (density = 6).—A medium-sized oval hop, rich in lupulin, with a moderate flavour. It is similar in the shape of its petals to the good Whitebine types, though belonging in colour to the poorer class of early hops. It is considered by the raiser as especially suited for growth on stiff land. (Fig. 10, page 78.)

From a botanical point of view it occupies an isolated position, without near allies, and is one of the two English hops known with certainty to have arisen from seed—the other being Fuggle's variety. The original plant was raised from seed, sown in 1880, by Mr. H. Bennett of Borough Green, near Sevenoaks. (Letter from Mr. Bennett, September 1898.)

B. MID-SEASON OR MAIN-CROP VARIETIES.

Rodmersham or Mercer's Hop (density 7½ to 8).—A Whitebine variety much resembling the Canterbury Whitebine hop, but earlier than this, though not so early as the Bramling. The plant is a good cropper and the hop rich in lupulin, but the aroma in the specimens I have examined is not quite so good as in the best hops, and there is a tendency for the lower petals to be greenish. (Fig. 11, page 80.)

This hop was selected by Mr. Robert Mercer of Rodmersham House, Sittingbourne, Kent, about 1880, from a garden of hops at West Malling, near Maidstone, reputed to be the Golding variety, and at least 150 years old. The original plant for several successive years was noticed by Mr. Mercer to come into hop earlier than the rest of the garden. (Letters from Mr. Mercer and Mr. J. F. Honeyball, New Gardens, Teynham, 1900.)

Cobb's Hop (density = 7).—A medium-sized hop, with thin pale-yellow petals; good in flavour, but somewhat poor in lupulin. The plant is a tall-growing Whitebine variety; earlier in ripening than the Canterbury Whitebine, but not so early as the Bramling. (Fig. 12, page 81).

It was introduced about 1881 by Mr. John Cobb of Sheldwich, near Faversham, the original plant being selected from one of Mr. Cobb's Canterbury Whitebine gardens by Mr. James

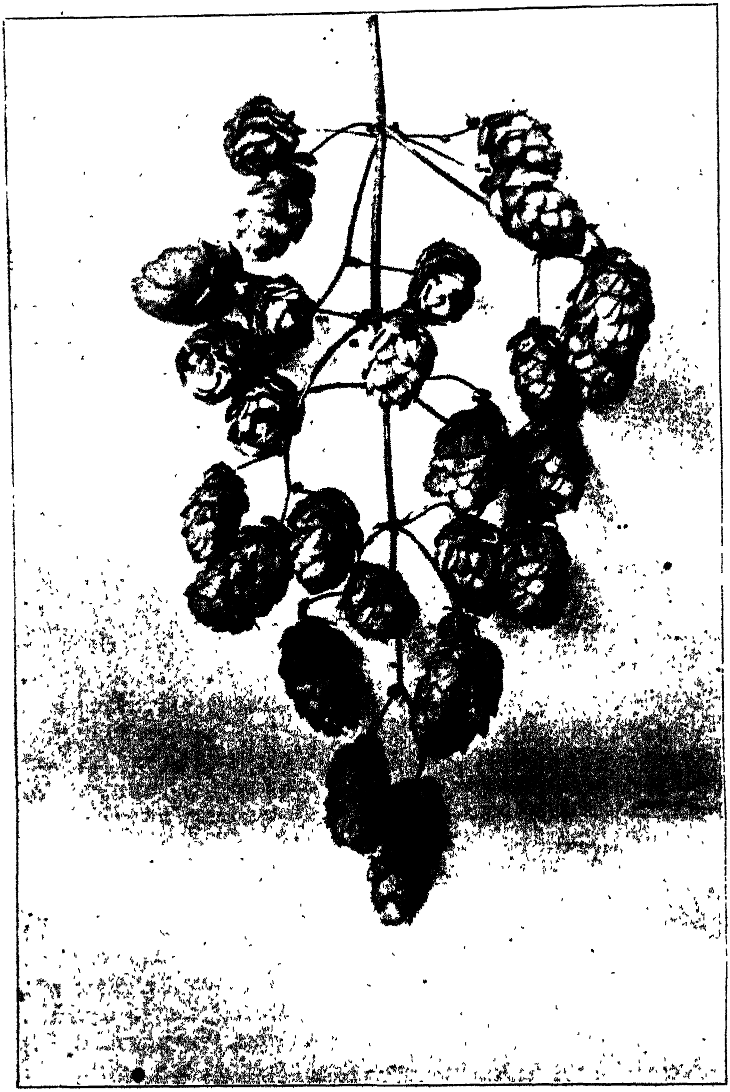

FIG. 11.—Rodmersham, or Mercer's Hop. (See page 79.)

West, hop factor. (Letters from Mr. West's son and Mr. T. Butcher, Faversham, who was present when the selection was made.)

Canterbury Whitebine; Farnham Whitebine; Mathon Whitebine (density about 7).—These hops, grown originally at Canterbury, Kent (fig. 13, page 82), Farnham in Surrey, and the parish of Mathon in Worcestershire (fig. 14, page 83),

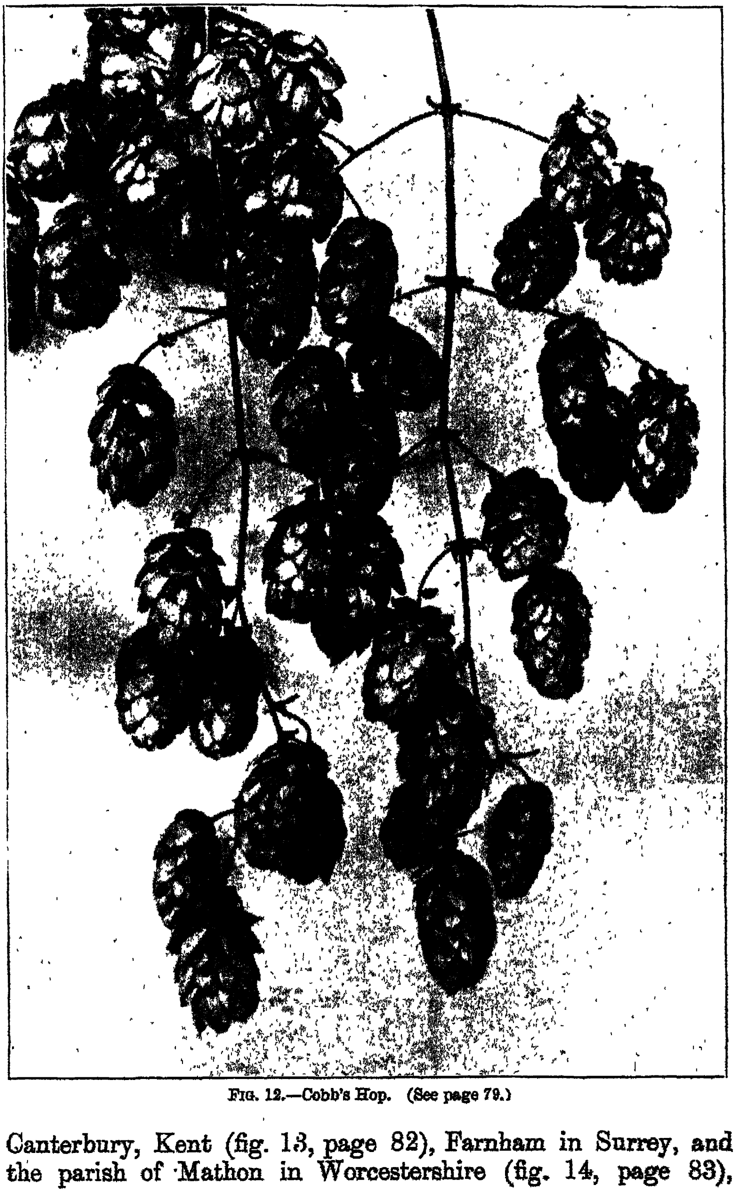

FIG. 12.—Cobb's Hop. (See page 79.)

respectively, are old varieties, so closely related in botanical characters that they cannot be distinguished from each other with certainty, and are, no doubt, one and the same variety. They all rank as hops of the very best class on account of the

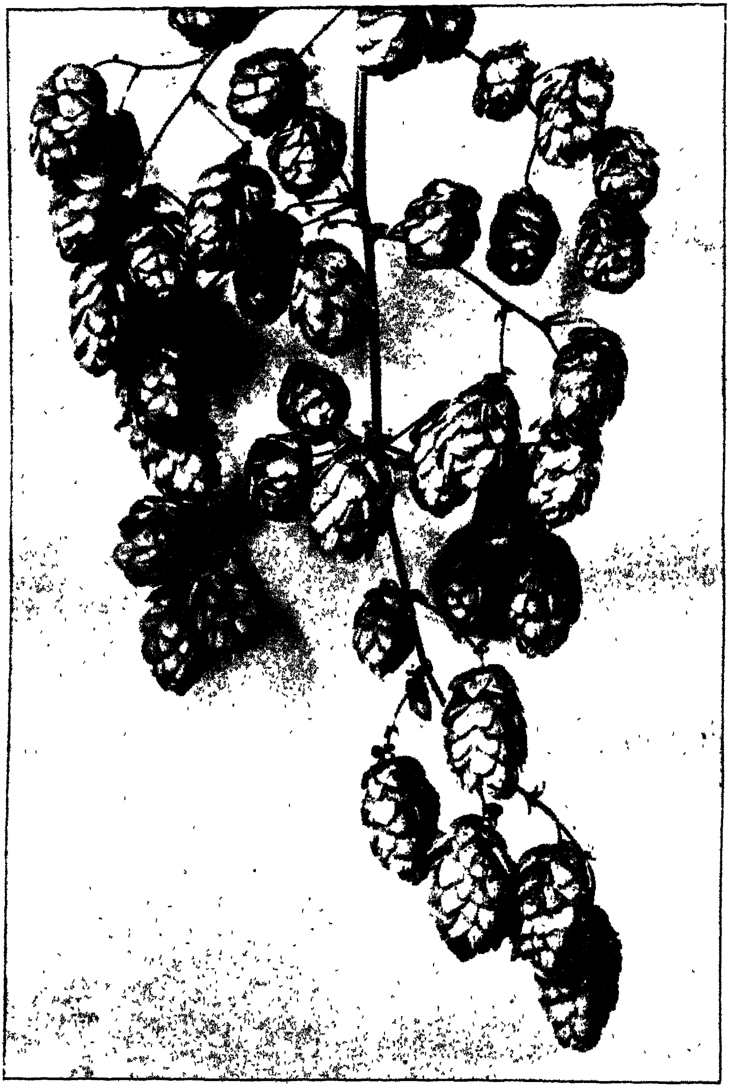

FIG. 13.—Canterbury Whitebine Hop. (See page 81.)

excellence of their flavour and their relatively high lupulin-content. Owing to their delicate constitution they can only be grown in the most favoured climates and soils.

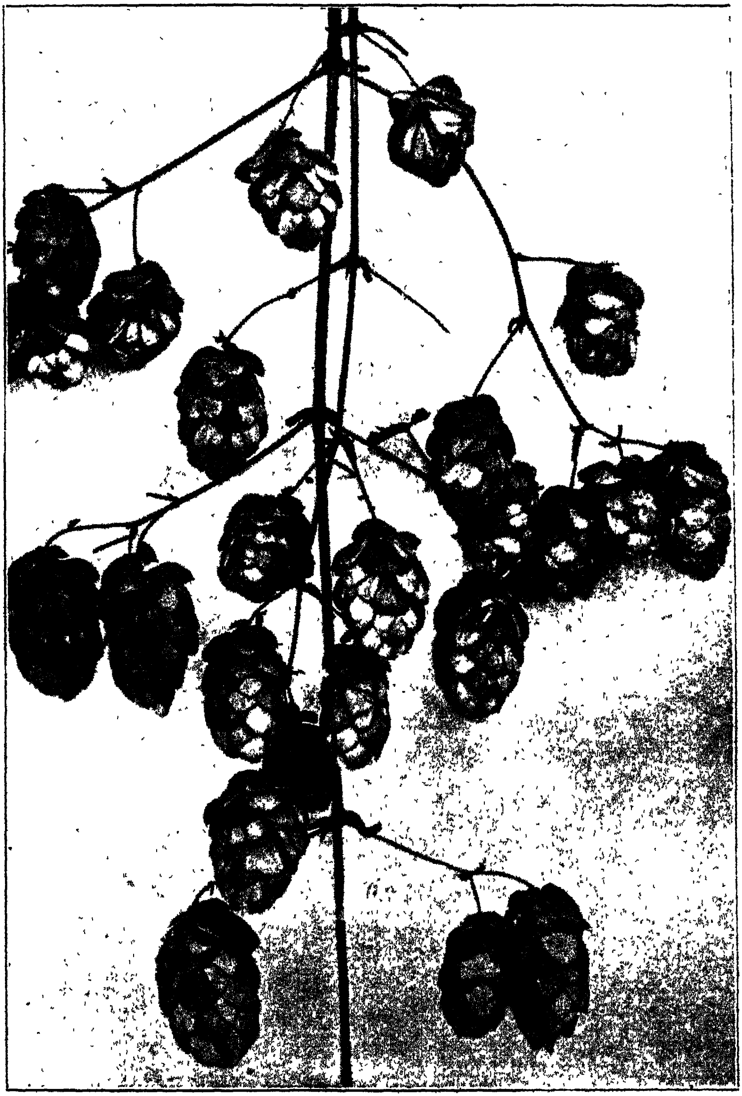

FIG. 14.—The Mathon Whitebine Hop. (See page 81.)

The Farnham hop is slightly smaller and not quite so round in section as the Canterbury variety, and usually the petals are closer in their arrangement on the strig of the hop. The colour is also a shade paler and more uniform on both kinds of petals.

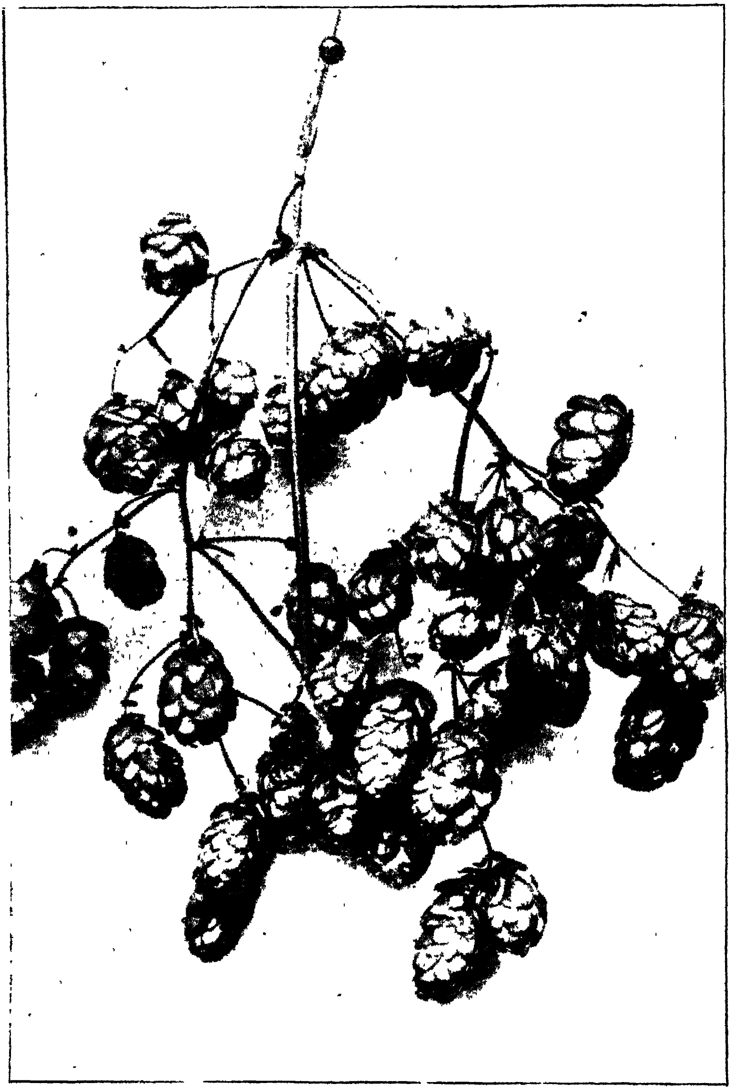

FIG. 15.—Cooper's Whitebine Hop. (See page 85.)

All the three varieties have pale-green bines, usually termed "Whitebines."

Cooper's White (density = 6¾ to 7).—A Worcestershire variety, extremely like the Mathon and Canterbury hops, and no doubt selected from the former. It is of good colour, high lupulin-content, but not quite such a good flavour as the best

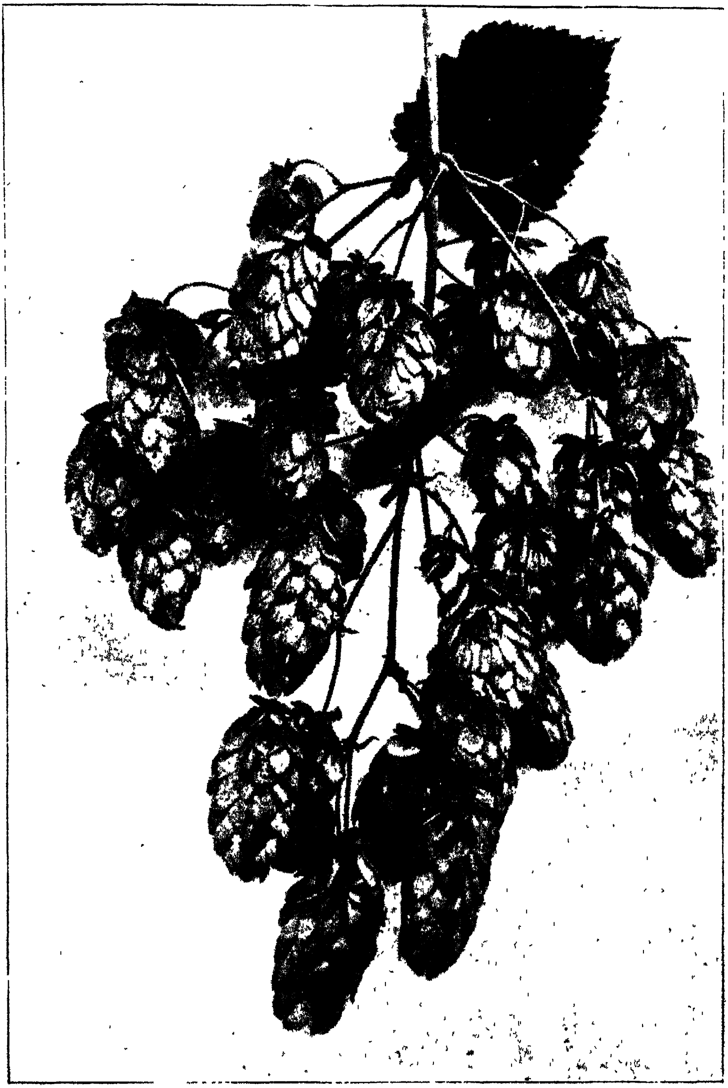

FIG. 16.—Fuggle's Hop. (See page 87.)

Whitebines. The plant is slightly earlier and more delicate than the Mathon hop, and its lateral branches usually not so long.

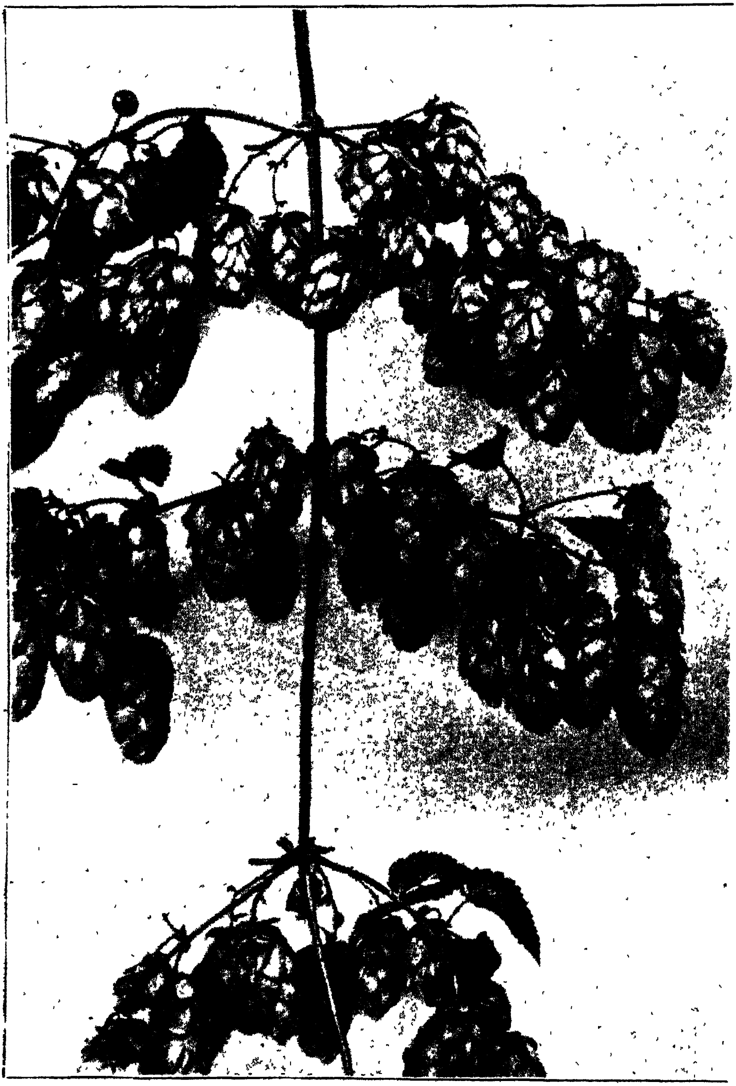

FIG. 17.- Old Jones's Hop. (See page 87.)

The petals are generally larger than those of the Mathor variety. (Fig. 15, page 84.)

Fuggle's Hop (density = 7).—This variety belongs to the class of large hops, though, in point of size, it is considerably smaller than the Prolific and Meopham varieties. When fully ripe the hops are square in section and pointed, very rich in lupulin, but somewhat coarse-flavoured and lacking the uniformly golden tint of the best Whitebines. The petals are thick and strong, the basal ones being generally of a darkish-green colour. (Fig. 16, page 85.)

The plant is a heavy cropper, thoroughly hardy, and well adapted for growth in the stiff damp land of the Weald and similar districts, where the Whitebines die out rapidly.

The bine is a sap-green colour. The original plant was a casual seedling which appeared in the flower-garden of Mr. George Stace of Horsmonden, Kent. The seed from which the plant arose was shaken out along with crumbs from the hop-picking dinner basket used by Mrs. Stace, the seedling being noticed about the year 1861.

The sets were afterwards introduced to the public by Mr. Richard Fuggle of Brenchley, about the year 1875. (Letters from Mr. John Larkin, Horsmonden, Mr. W. J. Noakes, Goudhurst, and others.)

Old Jones's Hop (density = 7 to 8).—A medium-sized oval hop of good colour and flavour, and fairly rich in lupulin. It is peculiar in having a somewhat narrow, pointed stipular bract and a round-tipped bracteole—a combination of characters rarely met with in English varieties of hop. The plant has short green bines. (Fig. 17, page 86.)

The origin of the variety I have not been able to determine, but it was grown and bore the name Jones' Hop as far back as 1798.[1]

The Golding Hop.—To a beginner desirous of obtaining definite ideas on the nature of hops, nothing is so puzzling or so annoying as the use of the term "Golding." The inquirer soon learns that it is sometimes employed to denote a particular variety, which every grower in the best districts says, and probably imagines, that he grows; and on other occasions, perhaps more especially in districts suited only to the coarser varieties, the term is extended to include a somewhat heterogeneous mixture of kinds possessing few discoverable characters in common except that they are hops.

However, at present among hop merchants and factors it is most customary to apply the term "Goldings" to the best class of hops, such as the Canterbury and Farnham Whitebines, the Bramling and Mathon hops, with Cobb's and the Rodmersham varieties, and stretched occasionally to include others of less repute.

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[1] See Article on the Management of Hops, by S. Rutley, Journal R.A.S.E. Vol. for 1848, p. 544.

We do not indeed hear of "Prolific" Golding, but the combination Fuggle's Golding and similar incongruous names are not unknown. In reality and strict honesty, the term should be applied to one special kind of hop only, the history of which is clear enough.

The first precise record of this variety is made by William Marshall in his "Rural Economy of the Southern Counties" (1798). Marshall spent the months of August, September, and October 1790 at Maidstone and made a study of the hop-growing industry in West Kent. The year following (1791) he was at Farnham for a similar purpose, and at Canterbury in 1795. In West Kent he states that, among others, the chief kinds of hops grown were:—

(1) The Canterbury hop, a Whitebine variety of medium size, and

(2) The Golding hop, which had recently become famous. He says: "It is, I understand, a sub-variety of the Canterbury which was raised by a man still living (1790), Mr. Golding of the Malling quarter of the district."

At Canterbury in 1795 the good qualities of the Golding hop were either unknown or not duly appreciated, for he mentions that only two varieties were grown in that district—namely, the Canterbury Whitebine and the Flemish Redbine hop.

It is thus clear that, although derived from the Canterbury Whitebine, the Golding hop was a specially-selected sort, which had distinct characters of its own.

John Banister, an excellent practical farmer, of Horton Kirby, in Kent, in his "Synopsis of Husbandry" (1799) describes the Canterbury, Farnham, and Golding hops as distinct varieties. The Rev. Luke Booker, in his poem "The Hop-Garden" (1799), mentions the "Golding-bine" as "far-famed" and, together with the Mathon hop, recommends it to the Worcestershire growers.

By the beginning of the nineteenth century it had been distributed to all parts of the country where good hops were grown. From the descriptions of later growers—namely, the writer of the article on hops in Baxter's "Library of Agriculture" (1846), Samuel Rutley, a Kent and Sussex hop-grower (1848),[1] and J. M. Paine of Farnham (1856)[2]—we find that the Golding hop was (1) a larger hop than the Canterbury Whitebine varieties, with (2) a bine more speckled with red, of less luxuriant growth, on which (3) the hops hang more singly than is the case with the Canterbury hop. All these writers agree on the above characters; but the Farnham grower thought it not quite so finely flavoured as the Farnham or Canterbury hop, while Mr. Rutley considered it richer in condition than these.

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[1] Journal R.A.S.E., Vol. for 1848, p. 543.

[2] Morton's *Cyclopædia of Agriculture*, 1855, vol. ii. p. 43.

It is thus seen that as late as the middle of last century the term "Golding" was kept to denote a special and distinct kind of hop, and it was not until much later that the practice began of adding the term to other varieties of less value with a view to increase the probability of their sale, and to call the Canterbury Whitebine a Golding.

The large, less-clustered hop and speckled shorter bine are sufficient to distinguish the true Golding from the Canterbury Whitebine proper, and many gardens known by the latter name are true Golding hops.

C. LATE VARIETIES.

The Grape Hop (density = 6¾ to 7).—The term "Grape hop" is applied to several distinct varieties, but the kind commonly known by this name, and to which it is perhaps best restricted, is a late variety with a sap-green bine. On account of the shortness of the branches on which the hops grow on the laterals, they appear crowded together, somewhat like a bunch of grapes.

The hops are square in section, somewhat narrow in proportion to their length, and pointed. The petals are not so smooth as those of the best varieties, but the colour and flavour when properly grown without excess of nitrogenous manure, are good, and among the Grape varieties are found the best quality late hops. (Fig. 18, page 90.)

Mayfield Grape. Worcester and Hereford (density = 6 to 6½).—This is a large, pointed hop of good colour and fair flavour. It is much less coarse than the hop sometimes met with in Kent under this name. It has botanical affinities with Fuggle's hop, but is later, thinner in petal, and not such an abundant cropper as the latter. (Fig. 19, page 91.)

Bates's Brewer (density = 7½ to 8).—A compact, very distinct hop, round in section, well closed at the tip, firm and extremely regular in the arrangement of its petals. In shape it is not unlike the Bramling hop, and is like the latter also in the strength and form of its petals. The strig is thickish, the lupulin-content high, but the flavour is moderate only, and the colour of the hop is uneven, the stipular bracts being darker than the bracteoles. The plants have dark-green bines and bear a moderate crop. (Fig. 20, page 92.)

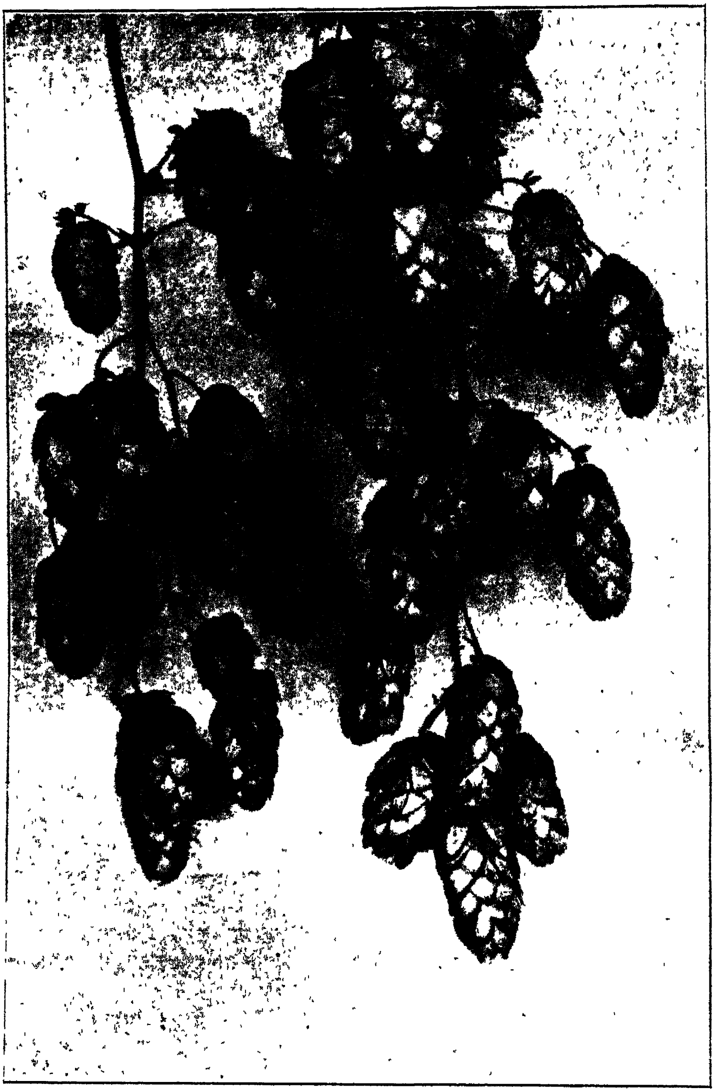

FIG. 18.—The Cluster Grape Hop. (See page 89.)

This hop was selected by Mr. Bates of Brenchley, about 1879 or 1880, from a garden in the Sevenoaks Weald district.

The six sets yielded by the original plant were bought for a bottle of whisky each, the old plant, after the cuttings were removed, being burnt on the spot. (Letter from Mr. Bates' son to Mr. George Neve, Sissinghurst, November 1899.)

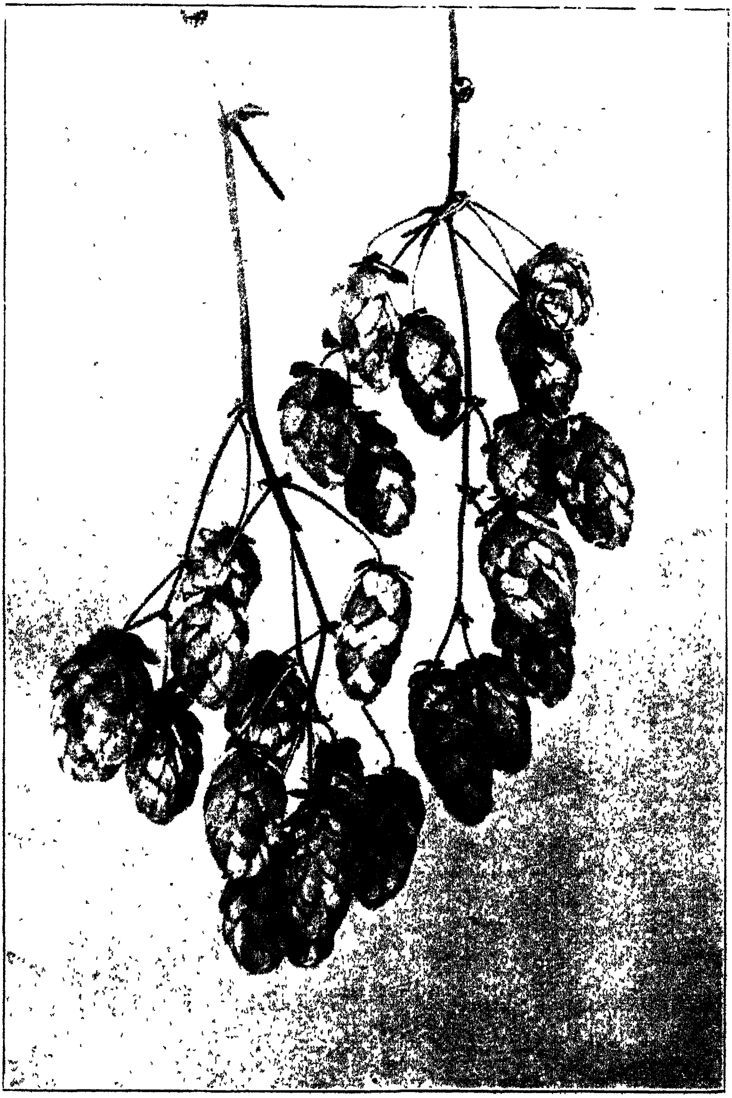

FIG. 19.—Mayfield Grape Hop. (See page 89.)

Buss's Hop (density=8 or 9).—A dense, small hop, with thin, very pale, smooth petals. It is of good flavour but poor in lupulin. The plants have red bines, are very hardy, and rarely suffer from attacks of vermin. (Fig. 21, page 93.)

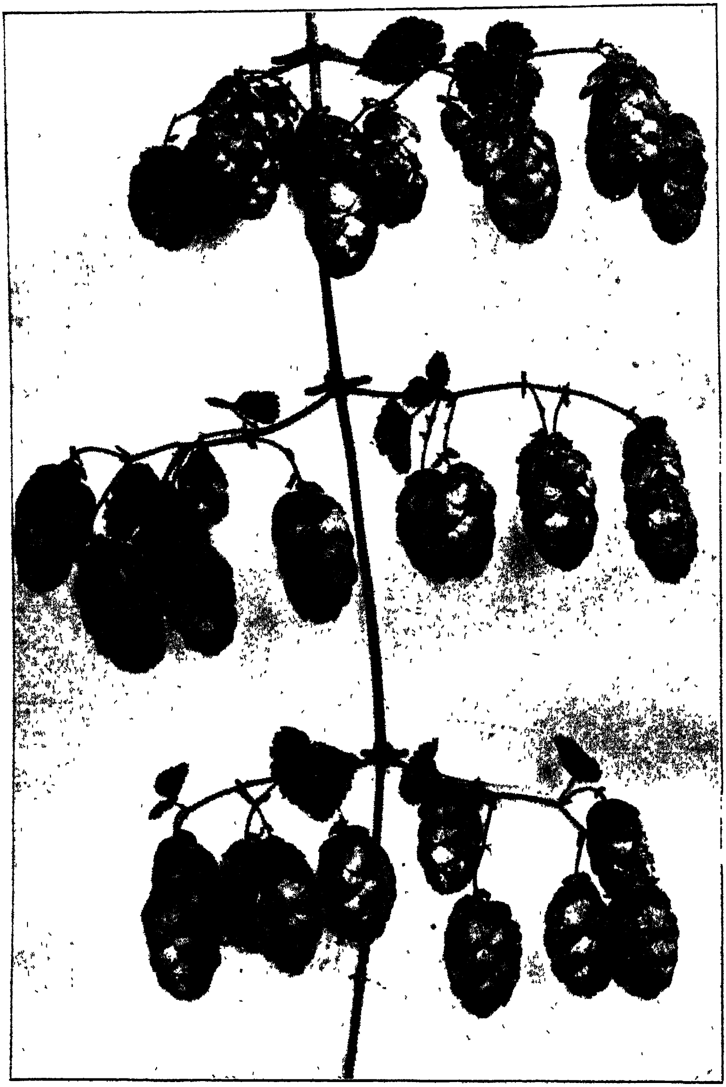

FIG. 20.—Bates's Brewer's Hop. (See page 89.)

The name is associated with Mr. B. Buss of Elphicks, Horsmonden, Kent, who tells me that some of his neighbours gave the name of "Buss's Late Golding" to the hop, which he obtained originally from a friend at Lyminge, in Kent, about

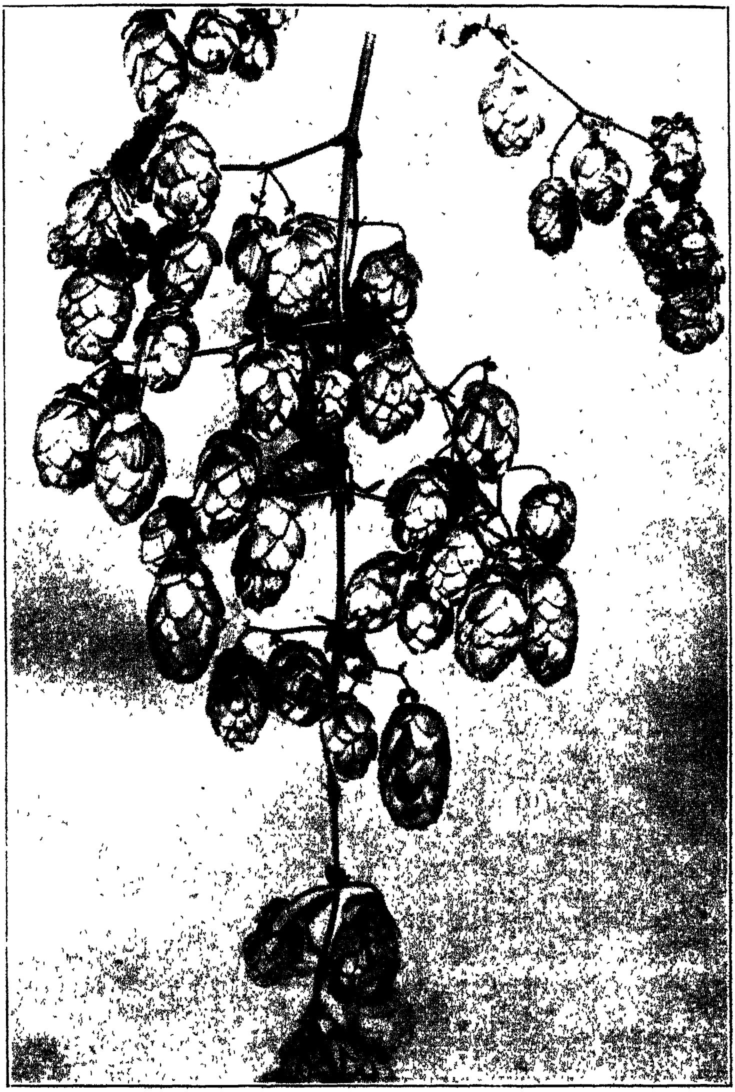

FIG. 21.—Buss's Hop. (See page 92.)

1869. Hops known as "Wildings" in many districts are identical with this variety.

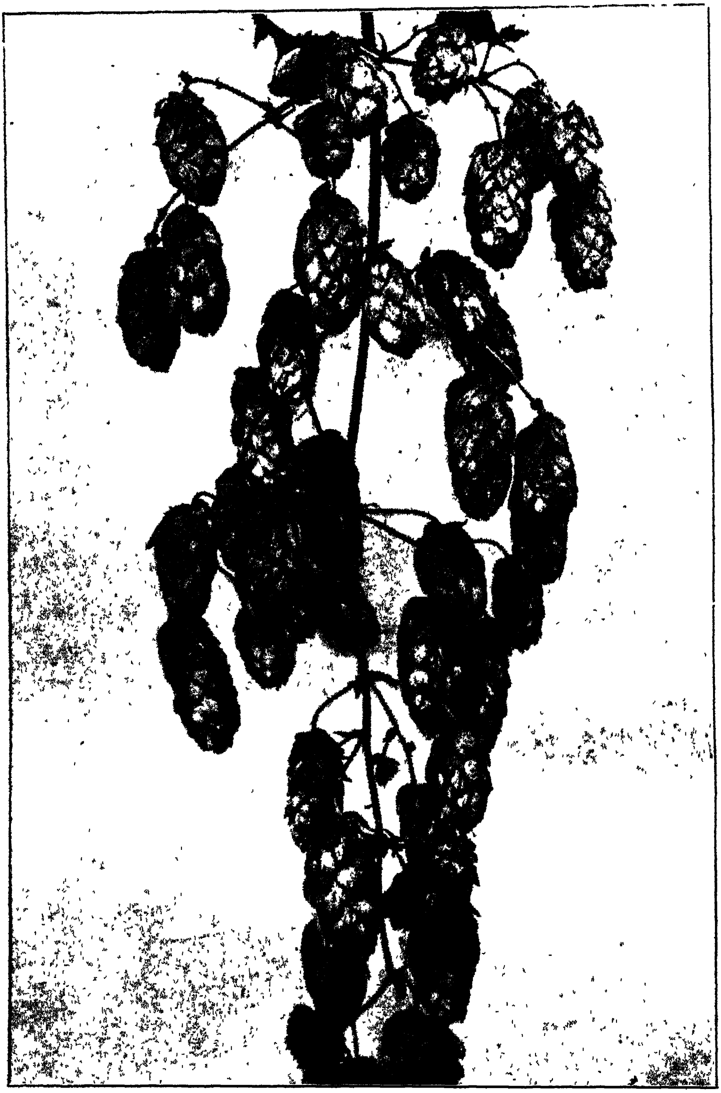

FIG. 22.—Colgate's Hop. (See below.)

Colgate's Hop (density = 7 to 8).—A long, narrow hop, square in section, and very late in ripening. It varies very much in size according to the soil and season. The petals are thin and pale in colour, and the hops, which grow in dense clusters, are inclined to be loose and open at the tip. They are not particularly rich in lupulin and have a disagreeable aroma. (Fig. 22, page 94.)

The slender branches on which the hops are borne are very rough, and the serrations of the leaves are deeper and more pointed than in any other English variety. The plant has a long green bine, which bears a very heavy crop. It is very hardy, and succeeds best on stiff land, but will grow on almost all soils.

This variety was introduced by Mr. David Colgate, of Chevening, Kent, about 1805, the original plant being discovered in a hedge.[1]

In conclusion it is necessary to point out that the estimates of the quality of the different varieties of hops described are based chiefly upon a study of their aroma, resin-content, and natural colour, and have been in no way influenced by the subsequent artificial treatment which the hops receive after picking.

The aroma can, of course, only be estimated by the sense of smell. In addition to my own estimate of this character in the different hops as met with in the gardens, I have taken into consideration the opinions and judgments of many of the best growers in this country.

In regard to what may be considered the most important feature of the hop--namely, its resin-content—I have been guided in part by the few published chemical analyses of the total resins present, but more especially by my own microscopic examination of the relative numbers of lupulin-glands upon the bracts of the different varieties and their weight after mechanical separation from the bracts.

On account of the methods of sale and want of knowledge on the part of brewers, the price which a sample of hops will fetch in the English market is not necessarily a measure of its real intrinsic brewing value. The part played by the hop in the brewing process is indeed a many-sided one, and the assessment of one or two of its characters is not likely to be an accurate guide to its value. It is, however, time that the brewer and hop-grower should make greater efforts to investigate and learn the essential nature of the commodity with which they deal, so as to bring about the sale of the hop according to its real merit.

JOHN PERCIVAL.

Wye, Kent.

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[1] Journal R.A.S.E., Vol. for 1845, p. 269.

EPIZOOTIC OR CONTAGIOUS ABORTION.

INTRODUCTION.

ALTHOUGH there are not available any statistics of the number of domesticated animals that annually fail to carry their young to full term, there is no room for doubt that the losses which agriculturists are at present experiencing from this cause are very serious. There is also good reason to fear that such losses have been mounting upwards during the past half-century, and that unless something can be done to check them, abortion will soon become, if it has not already become, the most formidable plague of at least one species of the animals of the farm. There is therefore the strongest of motives for investigation into the cause or causes of abortion, and for considering the means by which it may be prevented.

Before discussing the causation of abortion, it may be well to premise that while animals of all species occasionally cast their young, the accident is immensely more frequent in the bovine race than in any other, and that hitherto it is only abortion among cows that has received much attention in veterinary literature. At the same time, the subject has often been discussed with the tacit assumption that abortion has identical causes in all the domesticated animals in which it is observed.

To a certain extent this is true; but as long as there is any obscurity with regard to the common cause of abortion in any of these species, it is well to keep the mind open to the possibility that abortion in two different species may have entirely different causes. It has always been admitted that a number of well-known conditions and circumstances are apt to induce abortion in any pregnant animal, such as severe mechanical injury, great mental disturbance, and the existence of almost any disease which threatens the life of the mother.

Needless to say, when one of these causes is in operation it is almost certain to force itself on the attention of anyone seeking for the explanation of a case of abortion; but it has long been recognised that in by far the great majority of cases of abortion—at least among cows—the accident cannot reasonably be ascribed to any of these, and the great problem has been to elucidate the cause of abortion when the pregnant animal has neither been frightened nor grossly injured, and when, apart from the act of abortion, it would pass for healthy.

For convenience this latter sort of abortion may be called epizootic abortion, while the cases in which some of the causes mentioned above have obviously been in operation may be called sporadic. In this paper only the former kind of abortion will be discussed.

CAUSES OF ABORTION.

A tendency to speculate regarding the causes of phenomena which man recognises as being of importance to himself is part of the constitution of the human mind. Medical history shows that it has been freely indulged to explain the occurrence of disease, and especially of those diseases in which a large number of individuals are attacked simultaneously or in quick succession. Epizootic abortion is no exception to the rule. Many different conditions observed to be locally in operation have been accused of being the cause of widespread abortion; and when no tangible condition or circumstance could reasonably be fixed upon, others of an occult nature have nevertheless been assumed to be active, and incriminated as the cause of the mischief. Among the more tangible of the conditions thus seized upon to explain the occurrence of abortion were the injudicious use of certain articles of diet; domestication *per se*, that is to say, the withdrawal of animals from a state of nature; and the accidental administration of some poison, such as ergot. Among those not obvious, but assumed to be in operation, were some undefined injurious climatic conditions, a subtle sympathetic influence exerted on pregnant animals by one that had aborted, and, lastly, contagion.

During the last half-century, and more particularly during the last twenty years, there has been a growing conviction that the only one of these alleged causes that is capable of explaining the wide prevalence of abortion among cows is the last one—viz. contagion. The gradual acceptance of the view that abortion is contagious is an illustration of the survival of the fittest. It may be doubted whether some of the suggested causes, such as sympathy, were ever responsible for even a single case of abortion; and, while the others may occasionally have induced the act, a comprehensive survey of the varying conditions under which abortion prevails has made it evident that not one of them, nor any combination of them, can be held to offer a reasonable explanation of the abortion which is at present inflicting such serious losses on cattle-breeders.

In the first instance it was, therefore, largely by a process of exclusion that the theory of contagion came to hold the field as an explanation of the occurrence of abortion. As a theory, it was supported by a good deal of direct clinical evidence, and it was seldom negatived by the ascertainable facts in connection with the occurrence of outbreaks. It did not find ready acceptance at first; chiefly because the operation of contagion was rarely obvious, and partly because, starting with certain preconceived ideas as to the circumstances necessary for contagion, it sometimes appeared that the disease must have originated spontaneously.

In this respect it is very remarkable how history has repeated itself in connection with the controversies that have been waged regarding the nature and cause of different diseases. Horse-owners of the present day find it hard to believe that there can ever have been a time when the contagious nature of glanders was denied. As a matter of fact, the contagious nature of the disease was scarcely so much as suspected by horse-owners at the end of the eighteenth century; and many veterinary surgeons still in practice were brought up in the faith that glanders might, and very frequently did, arise without contagion. It is true that the mysterious influence of sympathy was not called in to explain the occurrence of the disease, but the very same agencies that have been invoked to account for abortion—bad food, foul air, &c.—were quite generally accepted as causes of glanders.

The history of the evolution of ideas regarding the cause of tuberculosis, pleuro-pneumonia, and swine fever has been almost identical. When one searches for an explanation of this tardy acceptance of what now appear to be obvious truths, it soon becomes apparent that the chief obstacle to immediate recognition of the real cause of these diseases was the considerable number of instances in which the operation of contagion was not only not obvious, but even appeared to be excluded by the circumstances; and that again was due to the insidious nature of the diseases mentioned, which made it possible for animals already infected and capable of spreading the infection to pass for healthy. Precisely the same considerations show how it was that for nearly a century after contagion had been put forward as the cause of abortion, other agencies continued to be invoked in explanation of the occurrence of outbreaks.

CONTAGION AS A SOURCE OF ABORTION.

It is probable that in the long run the force of evidence derived simply from clinical observation would have sufficed to establish, even to popular satisfaction, that glanders and tuberculosis are contagious diseases and never arise spontaneously. But it is certain that it was the evidence obtained by bacteriological investigation and experimental methods of inquiry that finally carried conviction to those who had previously been in doubt: and so it is with abortion. It would perhaps be going too far to say that bacteriological and experimental evidence has already led to the abandonment of the older theories of abortion, for the volume of such evidence in existence is not yet large, and what does exist is not very widely known. At the same time, it appears to form the complement of the proof derived from clinical observation, and to leave no room for doubt that there is a contagious disease of cows, with abortion for its only prominent symptom.

Where clinical evidence alone—that is to say, the evidence derived from observation of naturally occurring cases of disease—is insufficient to determine whether a given affection is spread by contagion or not, there are two principal lines along which further evidence may be sought by way of experiment. The first consists in placing presumably healthy animals in the circumstances supposed to be favourable for contagion or infection, and observing the result. The second consists in seeking to demonstrate the presence of a living agent of contagion—a bacterium or other parasitic being—in the bodies of diseased animals. As a matter of fact, the first of these methods alone is quite capable of furnishing conclusive evidence as to the contagious or non-contagious character of a disease, provided the experiments are sufficiently numerous and varied; and the mere discovery of the causal organism of a disease does not prove that disease to be contagious.

The truth of these statements will be obvious when it is recalled that smallpox is universally admitted to be contagious, although the actual germ which is the cause of the disease has not yet been discovered, and that tetanus or lockjaw is on all hands regarded as a non-contagious disease although there is the most conclusive proof that it is caused by a germ. But, notwithstanding these facts, history shows that when, in spite of a certain amount of clinical evidence, the contagious nature of a disease has not been generally admitted, the discovery of the living tangible cause of the disease has always exerted a great influence in bringing about a general acceptance of the view that the disease is really contagious. As will now be shown, both methods of experimental inquiry have been employed to obtain evidence as to the contagious or non-contagious character of abortion.

EXPERIMENTS ON ABORTION IN ANIMALS.

A number of attempts to experimentally transmit the disease which is the cause of epizootic abortion in cows have been carried out abroad, but the first experiments of that kind undertaken in this country appear to have been those of a Committee appointed by the Highland and Agricultural Society of Scotland in 1887.[1] They took the form of an attempt to transmit the disease (assuming that the act of abortion is merely the symptom of some underlying morbid condition) to pregnant cows and ewes. Taking the experiments with cows first, the report made by the Committee shows that they were varied as follows:—

1. A cow that had recently aborted was placed in a loose box at the Edinburgh Veterinary College with a healthy pregnant cow. The duration of the cohabitation was one month, and the result of the experiment was negative, the healthy cow dropping a healthy calf at full term.
2. A pregnant cow purchased from a healthy stock was placed in a byre in which a large number of cows had recently aborted, and at the same time a cotton-wool plug that had been kept for twenty minutes in the vagina of one of the recently aborted cows was introduced into the vagina of the experimental cow and left there for some hours. Seventy days afterwards the cow calved prematurely, two months before her time; and although the calf was alive when expelled, it survived for only a short time.
3. This experiment was similar to the preceding one, save that instead of using a contaminated cotton-wool plug to bring about infection, a small quantity of vaginal discharge from a recently aborted cow was injected under the skin of the vulva of the experimental pregnant animal. The result was a premature birth two months afterwards, and one month before full term. The calf survived, although it was very puny and unthriving, and the cleansing was retained.
4. This experiment was an exact repetition of the first one, and had a similar negative result.

The net result of the four experiments with cows was that the two inoculated cows aborted, while the two that were simply exposed to the risk of infection by cohabitation carried their calves to full term.

Dealing next with the experiments in which pregnant ewes were used, it appears that three out of the four had a positive result. In two of the three latter cases the ewes were infected by inoculation with discharge from a recently aborted cow, and in the other a cotton-wool plug soaked with such discharge had been used as in the second of the cow experiments.

A second set of experiments on lines somewhat similar to the preceding was carried out at the Royal Veterinary College,

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[1] See *Transactions of the Highland and Agricultural Society of Scotland*, Vol. xix., 1887, pp. 310-322, and Vol. i., 5th series, 1889 pp. 270-279; also Journal R.A.S.E., Vol. for 1891, pp. 739-741.

London, in 1894 and 1895, by the aid of a special grant made by the Royal Agricultural Society.[1] Eight experiments in all were carried out, and in each of these an attempt was made to infect a healthy pregnant cow, either by simple cohabitation with a cow that had recently aborted, or by such cohabitation supplemented by the introduction of discharge from the aborted animal into the genital passages of the healthy one. Only one of these experiments had a positive result. In that case a heifer, about four months in calf, was placed in the same loose box with a cow that had aborted six days previously. Seven weeks afterwards the heifer, without having exhibited any premonitory symptoms of abortion, expelled a dead fœtus.

Taking these two sets of experiments together, it will be seen that a positive result was obtained in six of the sixteen cases (three cows and three ewes), or 37½ per cent. In seven of the experiments with cows the pregnant animal was simply exposed to the risk of infection arising from association in the same building with one or more animals that had aborted, and in only one of these cases did the experimental cow abort In the remaining nine cases (five cows and four ewes) means were taken to insure that vaginal discharge from a cow that had aborted should actually find admission to the system of the experimental animal, and it is a noteworthy fact that five of these (or 55 per cent.) had a positive result.

It must be confessed that such a small series of experiments cannot be held to prove that the ordinary cause of abortion among cows is contagion, but, at the same time, the results obtained may fairly be said to strengthen considerably the evidence in support of that view which is derivable from clinical observation. It would be easy to attach too much importance in this connection to the fact that in the majority of the cases the experimental animal did not abort. In natural outbreaks, even when there appears to be full play for the operation of infection, it never happens that all the pregnant cows abort in a herd of any size, and in the majority of outbreaks less than half the cows abort. Moreover, the results of experimental attempts to transmit various diseases that are admittedly contagious teach that one should always be prepared to find a considerable proportion of failures. In the above-described abortion experiments, several different circumstances may have rendered the attempts to infect unsuccessful. In the first place, it is possible that in a number of the cases the germs of the disease never found access to the genital passages of the pregnant experimental animal. Secondly, the experimental animals may have been able to resist the infection; and, finally, some of the animals may actually have been infected although they did not abort.

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[1] Journal R.A.S.E., Vol. for 1894, pp. 312–317, and Vol. for 1896, pp. 106–109.

BACTERIOLOGICAL EVIDENCE.

Coming next to the bacteriological evidence bearing on the cause of abortion, it has to be noted that various observers during the last thirty years have attempted to identify in the discharges from cows that had aborted the bacteria which they supposed to be the cause of the disease. With one exception, however, all the evidence thus obtained may be dismissed as insufficient and untrustworthy. No importance whatever can be attached to the mere microscopic recognition of bacteria in the uterus of a cow that has aborted, or in the vaginal discharge from such an animal. The normal healthy pregnant womb and the fœtus which it contains are quite free from bacteria, but bacteria are constantly present in the vagina, and they are always abundant in the discharge which comes away for some days after a perfectly normal parturition.

No claim to the discovery of the germ or bacterium of abortion can be admitted unless it is supported by proof that this bacterium is present in the body of the pregnant animal before the expulsion of the fœtus, and unless it can be shown that material which contains this and no other germ can be experimentally employed to produce abortion. The only bacteriological investigation regarding the cause of abortion that appears to have fully satisfied these conditions is one which was carried out by Professor Bang, of Copenhagen, six years ago.

In the month of December 1895, Professor Bang obtained the opportunity to make a post-mortem examination of a five-year-old cow belonging to a herd in which there had been numerous cases of abortion. The cow in question had herself been showing the premonitory symptoms of abortion for four days. The cow was slaughtered, and the uterus together with its contained fœtus was removed to the laboratory for careful bacteriological examination. On cutting through the wall of the uterus it at once became apparent that a marked abnormality was present, there being a considerable quantity of thick, slimy, yellowish liquid between the uterus and the envelopes of the fœtus. Microscopic examination of this liquid showed that it contained large numbers of a small bacillus, apparently unmixed with any other organisms. It was found that this bacillus was not readily cultivated by ordinary methods, but

Professor Bang succeeded in growing it in blood serum rendered solid by a mixture of gelatine and agar. When grown in this medium it exhibited quite remarkable characters, sharply distinguishing it from any other known pathogenic organism.

The importance of this discovery of a particular organism in circumstances which proved that it must have been present in the uterus while the cow was still alive was largely strengthened by the investigation of subsequent cases. In these later cases the cows were not killed, but the afterbirth and the exudate that came away immediately after abortion were examined bacteriologically, and in nearly every one of these cases Professor Bang was able to recognise microscopically, and in many cases to cultivate artificially, the same bacilli which he found in the first case.

These observations, of course, did not do more than make it probable that the actual germ of epizootic abortion had been discovered. The next step was to ascertain whether it was possible to induce abortion in pregnant cows or other animals by infecting them with pure cultures of the organism in question. It is interesting to observe that, just as with some of the experiments previously referred to in this paper, the attempts to infect were not uniformly successful. In the first two experiments the attempt to infect was made by introducing a quantity of an artificial culture into the vagina. One of these cows was killed nineteen, and the other twenty-nine days afterwards, but the post-mortem examination showed no abnormality in connection with the uterus or with the envelopes of the fœtus. The experiments therefore appeared to have entirely failed. It was supposed to be not impossible that the two experimental cows, the history of which was not known, might have come from a herd in which abortion had prevailed, and have themselves at some previous time aborted and thereby acquired immunity.

In the next experiments the cows were purchased from a stock known to be free from abortion. One of the cows was four years old and the other seven years old, and they had been bulled on January 14 and 16 respectively. These cows were placed in one of the horse stables at the Copenhagen Veterinary College, and on April 14, 1896, a rather large quantity of pure culture of the abortion bacillus was injected into the vagina of each cow. Inasmuch as the cows exhibited no abnormal symptom during the next five weeks, it was feared that the experiments were again going to miscarry, and the injections into the vagina were repeated on May 23 and June 4. On June 23 premonitory symptoms of abortion were observable in the seven-year-old cow and to a slighter extent in the four-year-old one.

The latter animal aborted on June 24, at which time the fœtus was five months old. The characteristic abortion bacilli were detected in the discharge which came away from the uterus afterwards.

The other cow was slaughtered on June 24, and the examination of the uterus disclosed conditions identical with those present in the naturally occurring case of abortion in which the abortion bacilli had first been discovered.

It would occupy too much space to describe in detail the remaining experiments that were carried out. Suffice it to say that these later experiments showed that by using pure cultures of the abortion bacillus it was possible to induce abortion in ewes and mares, as well as in cows, and that the abortion could be brought about by injecting the bacilli direct into the veins as well as by introducing them into the vagina.

We are now in a position to sum up the present state of our knowledge regarding the cause of abortion in cows. In the first place it must be admitted that no suggested cause except contagion offers a reasonable explanation of the present wide prevalence of abortion in that species. When attention is confined to one or two outbreaks, some other condition and circumstance that might with some slight show of reason be fixed upon as the cause of abortion may be found to be in existence; but when a large number of outbreaks are brought under review it is always found that no such condition has been common to the whole of them, and in many of them the only explanation that is left to fall back upon is the operation of contagion.

In the second place there is a respectable body of clinical and experimental evidence to show that a cow that has recently aborted is capable of infecting healthy pregnant cows so as to induce abortion in them.

Finally, bacteriological examination has demonstrated the presence of a particular bacterium in the uterus of a cow showing the premonitory symptoms of abortion, and taken from a herd in which numerous cases of abortion had recently occurred. This bacterium has been cultivated in a state of purity outside the body, and abortion has been induced in apparently healthy pregnant cows and other animals by introducing such pure cultures into the genital passages.

POINTS STILL UNDETERMINED.

Although it may thus be accepted that the main facts regarding the causation of epizootic abortion have been definitely ascertained, a considerable number of important points in connection with the dissemination of the disease still remain to be cleared up. What is definitely determined is that epizootic abortion is in reality a contagious or infectious inflammation of the womb, caused by a bacillus with certain well-defined characters. The act of abortion is thus nothing more than a symptom of the disease, and stands to the inflammation of the uterus in precisely the same relation as vomiting does to an attack of gastritis, or coughing to inflammation of the lungs. Moreover, it is perfectly certain that a cow may be the subject of this form of uterine disease without bringing forth the calf prematurely—a fact which is manifestly unfortunate, in the sense that it makes the diagnosis of the disease difficult and facilitates the subtle spread of the infection.

As regards the method in which the disease is naturally contracted, there appears to be no reason to doubt that in most cases the specific bacilli obtain entrance to the womb by way of the external genitals, such bacilli having previously escaped with the discharges from a former subject of the disease.

Professor Bang's experiments show that infection of pregnant animals is effected with great certainty by injecting the bacilli into the veins, and some of those carried out by the Committee of the Highland and Agricultural Society indicate that the same result may follow subcutaneous inoculation. Intravenous inoculation can never be a natural method of infection, and the same may almost be said of inoculation under the skin. But it is by no means certain that infection by way of the mouth or respiratory passages is impossible. No experiments bearing on that point have yet been carried out.

Another undetermined point is whether non-pregnant cows and heifers may contract the disease. This may appear improbable, but it is certainly not impossible. In this connection it is interesting to note that when Professor Bang inoculated a bull calf subcutaneously with a culture of the abortion bacillus, the animal developed an attack of fever which lasted for four days. A precisely similar elevation of temperature was set up in a pregnant cow by subcutaneous inoculation, and four weeks afterwards the animal calved a full-term calf, but abortion bacilli were present in the discharge after parturition. In this case, however, an attempt to infect by intravaginal injection had also been made, about eleven weeks before the cow calved, and it is therefore impossible to say in which of the two ways infection had been brought about.

It has previously been pointed out that not every bacterial disease is naturally contagious or infectious, and although it must be concluded that the disease now being discussed is spread by contagion, it is conceivable that it may sometimes arise independently of contagion. This is another way of saying that, although the ordinary mode of life of the abortion bacillus is to multiply in the bodies of infected cows, it is possible that it may also be able to multiply outside the animal body—in soil or dirt for example. If that were the case, it is obvious that instances of abortion might sometimes be due to infection with such materials containing the bacilli. This would be an easy way of explaining the first case of abortion in an outbreak where the circumstances appeared to exclude the possibility of contagion. As a matter of fact, however, there is no recorded outbreak regarding which it would be justifiable to assert that the possibility of contagion was excluded. For example, there is nearly always a clear possibility that the disease may have been introduced with some apparently healthy, but in reality affected, cow; and sometimes an unsuspected bull may have brought the contagion, for it is pretty well ascertained that a bull which has served an infected cow is for some time afterwards capable of infecting other cows served by him.

The cases in which one is most tempted to fall back upon a supposed sporadic origin to explain the starting-point of an outbreak are those in which the disease makes its appearance among heifers at grass, and carrying their first calves to a young bull never previously used for cows. More than one outbreak of that kind has come under the notice of the writer, and in circumstances that appeared to exclude the possibility of direct contagion since any of the heifers were put to the bull. These are the most puzzling outbreaks encountered in practice, and when they occur they generally offer to the lay mind an insuperable obstacle to acceptance of the view that the disease is contagious. But such cases are highly exceptional, and even when they do occur one is not absolutely driven to admit that the disease has had a sporadic and not a contagious origin. Alternative conclusions are that the pasture had remained contaminated from the discharges of some infected cow previously pastured there, that the agents of infection had been transported by some intermediary bearer (as in some outbreaks of foot-and-mouth disease), or that some of the heifers had been infected by contact with cows before they were put with the bull.

PREVENTION.

A consideration of measures of prevention must embrace both those which are necessary to keep a healthy stock free from abortion, and those which are calculated to bring an outbreak of the disease to an end. With regard to the former, it can only be said that nearly every breeder in the country is exposed to the risk of having this disease introduced into his herd, and that for the great majority there are no practicable measures by which that risk can be entirely avoided. The risk is inseparable from the purchase of cows, and possibly also of heifers, except when these can be bought with complete assurance that they come from a stock free from abortion. There is also some risk, though doubtless a considerably smaller one, in buying bulls that have previously been used; and there is a decided risk in allowing a bull to be used for the service of outside cows. In the case of most other contagious diseases quarantine of new stock is a valuable safeguard, but here it is impracticable. One cannot always isolate newly purchased cows until they have calved, and even that might not suffice to prevent the introduction of the contagion, for, as previously mentioned, it is certain that a cow may be infected with this disease and yet carry her calf to full term.

Turning next to the measures necessary to bring an outbreak to an end, it must be admitted that great difficulties present themselves here also. The difficulties are of the same nature as those which attend the eradication of tuberculosis, and are mainly dependent on the fact that for weeks, and possibly for months, a cow may be infected, and capable of infecting others, without presenting any symptom pointing to her dangerous state. It therefore often happens that before the existence of the disease in the herd is realised a considerable number of cows have become infected.

Although it is probable that a cow suffering from this disease may infect others before she has herself aborted, there is no doubt that by far the most dangerous period is when the infected cow aborts and during the following few weeks. An enormous number of abortion bacilli are expelled with the fœtus and cleansing, and with the discharge that subsequently comes away. It is therefore of paramount importance strictly to isolate every cow that shows signs of impending abortion or has actually aborted. The fœtus and the cleansing must be destroyed or deeply buried in some place from which cattle are excluded, and if the abortion has taken place in the ordinary cowshed the most thorough cleansing and disinfection must be practised. As regards the isolation of the cow, that cannot be considered complete unless it includes a separate attendant for the animal or animals that have aborted. As long as it is practicable any cases of abortion that follow the first must be treated in the same way.

It goes without saying that these precautions are not necessary when it is certain that the abortion is the result of an injury or other cause than contagion; but when there is any doubt on that point—and there usually is a doubt—the case must be treated as a contagious one. If this injunction were always followed much subsequent trouble would often be averted.

Next in importance to isolation of the cows that have aborted comes disinfection of the cowshed from which they have been removed, and in which the other cows remain. This is designed not merely to destroy the bacilli voided in the building by the cow that has aborted, but also to prevent the further spread of the disease on the assumption that some of the remaining apparently healthy cows are already infected. The more frequent and thorough this disinfection is the better, and the parts that should receive most attention are the channel in which the urine is drained away, and the floor behind that. Unfortunately some of the disinfectants in common use cannot here be employed, since they are apt to taint the milk. Sulphate of copper (bluestone) is free from this objection, and a reliable disinfectant solution may be made by dissolving six ounces of it in a gallon of water. In Denmark, for this purpose, free sprinkling of the floor with powdered lime has, it is said, been employed with good effect.

As a further precaution it is well to sponge the root of the tail and the external genitals of each cow once daily with a disinfectant liquid, such as a 2 per cent. solution of carbolic acid, Jeyes' fluid, or lysol, or the following solution of corrosive sublimate:—

Corrosive sublimate	2½ drachms
Hydrochloric acid	2½ ounces
Water	2 gallons

It must be remembered that this solution is highly poisonous, and that it rapidly corrodes metallic vessels. It has also been recommended to syringe out the vagina of each cow once a day with one of these liquids, and no doubt it is a safeguard of considerable value. Unfortunately it involves a great deal of trouble, and in most cases it excites more or less severe straining after each injection. If it is not carried out generally, it is at least advisable to employ it on the newly-calved cows, syringing them once or twice a day for a week, or until all visible discharge has ceased.

It would be idle to ignore the fact that in many outbreaks the measures above prescribed are not practicable in their entirety. Before treatment is begun, or in spite of such treatment, the number of cows that have aborted may be so large that isolation of them becomes impossible. In such a case the next best thing to isolation in the proper sense of the term is to place the animals that have aborted together at one end of the cowshed, taking care to choose their stalls so that the urine shall not flow from them in the direction of the healthy cows. When that is done it is, of course, imperative to syringe out these cows daily for some weeks after all visible discharge has ceased.

A point that remains for consideration is what to do afterwards with the cows that have aborted. That should be determined by their number. If only one or two have aborted, the wisest plan is to take no further risk in connection with them, but to keep them permanently isolated until they can be fattened for the butcher. On the other hand, when they form a considerable proportion of the whole herd, and it has been impossible to isolate them, it is best to keep them on the chance that they will not abort again. Experience has shown that repeated or even second abortions are the exception, though it must be admitted that the exceptions are not rare. There are grounds for thinking that, as in some other contagious diseases, recovery from a first attack of epizootic abortion leaves the animal for a time protected against a second attack. Where this plan of retaining the aborted cows is adopted, a separate bull should be used for them, or if that is not practicable the penis and sheath of the bull should be syringed out with a disinfectant after the service of each cow.

Lastly. it is well to remember the possibility of the abortion bacillus retaining its vitality for a considerable time in the manure. Disinfection of the cowshed can never be so thorough as to ensure the destruction of all the germs of abortion voided by affected cows, and it is therefore not advisable to spread the manure from an infected herd on pasture to which cows will have access soon afterwards.

ABORTION IN MARES.

As previously mentioned, cases of abortion occasionally occur in all the domesticated animals, but the only species other than the bovine in which the accident is at all common is the equine. Although abortion among mares has not yet in any country become such a serious plague as abortion among cows, it is nevertheless so common as to make the question of its causation one of great practical importance to the breeder. Moreover, there is some reason to fear that abortion among mares has become more prevalent during recent years, and that it is still on the increase.

There has, unfortunately, not yet been obtained such precise evidence regarding the cause of abortion among mares as has within recent years been accumulated concerning the same complaint among cows. In one respect the attendant circumstances are often alike, that is to say, they are such as to suggest the operation of contagion, or they appear to exclude every other cause that might reasonably be adduced in explanation of the occurrence.

In this connection the question naturally arises whether abortion among cows and mares is due to one and the same cause. As bearing on that point it has to be noted in the first place that both in this country and abroad the simultaneous occurrence of abortion in the herd and stud on the same farm has more than once been observed; and, secondly, that Professor Bang's experiments already referred to appear to prove that the bacillus of what may be called bovine abortion is also capable of inducing abortion in the mare. On the other hand, there are considerations which suggest that most outbreaks of abortion among equines are not in any way connected with contagious abortion of the cow.

Although opportunities for the spread of the contagion from cows to mares must often exist, the simultaneous occurrence of abortion in pregnant animals of the two species on the same premises is, after all, quite the exception. Furthermore, the clinical characters of abortion in the mare are as a rule different from those of contagious abortion in the bovine species, and also different from those observed in Professor Bang's experimental case in the mare. At least in a good many outbreaks of abortion among mares the symptoms are of a more acute type, and the period of incubation appears to be shorter than in contagious abortion of the cow. It is well known that in the latter species there is practically no evidence of constitutional disturbance either before or after the act of abortion, apart from those that are obviously attributable to the retention of the cleansing. In the mare, on the other hand, a rise of temperature and other signs of serious constitutional disturbance are frequently observable before the foal is cast, and a violent inflammation of the womb afterwards is of far more frequent occurrence than in the cow.

In view of these facts, it must be confessed that there does not at present exist sufficient evidence to enable one to say whether abortion among mares is a disease identical with contagious abortion of cows, or an entirely distinct affection.

On one point, however, the evidence relating to the cause of equine abortion does appear to be sufficient—that is to say, the facts already accumulated warrant the conclusion that there is a contagious disease of the mare with abortion for its most important symptom, with the corollary that when a mare aborts from any cause that is not obvious all the precautions suggested by a fear of contagion should be put in force.

The chief of these precautions are strict isolation of the affected mare, destruction of the fœtus and its envelopes, and thorough disinfection. Fortunately, it is generally easier to carry out these measures than in dealing with outbreaks among cows, but it is to be feared that hitherto they have generally been neglected, or employed in too perfunctory a manner. There is even greater reason for such precautions in the equine than in the bovine disease—firstly, because of the greater value of the animals; and, secondly, because there are grounds for thinking that the infection is more readily spread among mares.

ABORTION IN EWES.

Some interesting statistics regarding abortion in ewes were published by Mr. Walter Heape in an article which appeared in the Society's Journal for 1899 (p. 217). The information collected by the author from over 300 flock-masters showed that in more than two-thirds of the flocks less than 2 per cent. of the ewes aborted, and that less than one-tenth of the flocks had over 5 per cent. of abortions. The highest percentage of abortion given in a Table relating to 397 flocks is 23·75, but elsewhere in the article it is stated that many flock-masters in the Wolds have had as high as 50 per cent. of their ewes abort. These serious outbreaks are said to have usually occurred ten days before lambing time, and to have sometimes involved several neighbouring flocks at the same time.

It may be assumed with some confidence that, except when the proportion of abortion in large flocks rises to more than 20 per cent., contagion is not likely to have been in operation. On the other hand, when from 30 to 50 per cent. of the pregnant ewes abort, and especially when this occurs simultaneously in several neighbouring flocks, a distinct suspicion of contagion is raised. Unfortunately, it does not appear that any outbreak of such dimensions among ewes has ever been submitted to the clinical and bacteriological investigation that would be necessary to establish the contagious nature of the disease.

In this connection it ought to be remembered that the transmissibility of the disease called epizootic abortion in cows to pregnant ewes has been experimentally proved, but it does not follow from that fact that any of the naturally occurring outbreaks in ewes are of the same nature. Indeed, if the statement that in ewes the abortions usually occur within a week of full term is correct, the disease can hardly be the same as that which is common among cows. The latter disease is one with a considerable period of incubation, and it is in the highest degree probable that if it broke out among ewes the abortions would occur at all stages of pregnancy, and would not all fall within the last week before the date of normal parturition. The occurrence of a large number of abortions within a short period in a flock of ewes would point either to the action of a contagium of much greater intensity or virulence than that which is accountable for abortion in cows, or to the operation of some other injurious agency, acting simultaneously on all the animals of the flock.

It may also be pointed out that there are circumstances connected with the breeding of sheep which are opposed to the spread of contagious abortion among ewes, assuming that such a disease ever attacks these animals in natural conditions. The housing of cows, the fact that in many herds the calving season is spread over several months or even over the whole year, the common practice of putting cows to the bull within a month or two after calving, are all favourable to the spread of a contagium which thrives only in the pregnant womb. On the other hand, the out-of-door life of sheep, the fact that the lambing of a flock is generally practically completed in a month or six weeks, and the long period that naturally elapses between two successive pregnancies obviously tend to interfere with the spread of a disease which is peculiar to the pregnant state.

It must be confessed, however, that there does not at present exist any reliable information to show whether a contagious form of abortion does or does not occur in the sheep. The question is not one to be determined by abstract reasoning, or by statistical observations, but by careful inquiry into the clinical facts whenever large numbers of ewes abort, supplemented by pathological and bacteriological investigation of the state of the womb in ewes which show signs of abortion, or which have actually aborted.

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THE CARDIFF MEETING, 1901.

Although certain English towns in the north and west have hitherto served the districts in the scheme of rotation to which North and South Wales respectively belong, the Royal Agricultural Society's Annual Show has only once previously been held within the borders of the Principality, viz. at Cardiff in 1872, so that a long interval of nearly thirty years separates the two Meetings that have now taken place at the Welsh Metropolis. The difference between the Cardiff of a generation ago and the Cardiff of to-day is apparent from the single fact that whereas in 1872 Cardiff was a comparatively small town of 39,675 inhabitants, it now ranks as the third port of the Kingdom, and numbers with its surrounding urban districts a total population of 223,005.

The following Table gives the names of the places at which have been held previous Meetings of the Society in District F, comprising the counties of Gloucester, Hereford, Monmouth, Salop, Stafford, Warwick, and Worcester, and South Wales:—

Year	Place of Meeting	President	Entries of Live Stock	Number of Implements separately catalogued	Persons paying for Admission
1842	Bristol	Henry Handley, M.P.	510	455	No record
1845	Shrewsbury	5th Duke of Richmond	437	942	No record
1853	Gloucester	Lord Ashburton	737	1,803	36,245
1859	Warwick	Duke of Marlborough	1,159	4,618	55,577
1863	Worcester	Viscount Eversley	1,219	5,839	75,807
1871	W'hampton	Lord Vernon	1,267	7,650	107,519
1872	Cardiff	Sir W. W. Wynn, Bt., M.P.	1,293	5,843	85,185
1876	Birmingham	Lord Chesham	1,499	6,414	163,413
1878	Bristol	Col. Kingscote, C.B., M.P.	1,354	6,837	122,042
1884	Shrewsbury	Sir Brandreth Gibbs	1,664	5,241	94,126
1892	Warwick	Earl of Feversham	1,864	5,430	96,462
1898	Birmingham	Earl Spencer, K.G.	2,323	4,938	98,277
1901	Cardiff	Earl Cawdor	1,575	4,070	167,423

The Show Ground.

The site selected consisted of the Recreation Ground adjoining the Sophia Gardens, and portions of the Pontcanna Farm, belonging to the Marquis of Bute, the whole area used for the Showyard comprising 89½ acres. Situated between the River Taff and the Cathedral Road, and within a mile from the centre of Cardiff, the Show was conveniently accessible to visitors, but this advantage was somewhat lessened by the long and narrow shape of the Showyard itself, the distance from the principal entrances to the Grand Stand being about three-quarters of a mile. A beautiful double avenue of young trees, running almost the entire length of the Showyard, and a tiny tree-bordered tributary of the river Taff were picturesque features of the site, which altogether was pronounced one of the most delightful of the many pleasing spots upon which the Society's Shows have been located. The plan of the Showyard on the opposite page indicates the nature of the site and the manner in which the various departments of the Exhibition were provided for.

ENTRIES.

The following is a comparative Table of the number of entries in both the Live-Stock and Implement Departments of the Show for the last ten years, 1892 to 1901:—

Number of Entries at the last Ten Meetings (1892–1901).

Number of Animals or Pens entered	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897	Leicester, 1896	Darlington, 1895	Cambridge, 1894	Chester, 1893	Warwick, 1892
Horses . .	355	696	424	709	981	594	650	617	509	447
Cattle . .	553	687	683	792	821	594	548	659	758	605
Sheep[1] . .	519	614	631	624	701	551	505	588	631	610
Pigs . . .	148	—	147	198	185	144	—	—	161	202
TOTAL . .	1,575	1,997	1,885	2,323	2,688	1,883	1,703	1,864	2,059	1,864
Poultry . .	701	629	669	964	867	901	769	705	836	836
Produce . .	521	528	625	635	715	574	476	538	957	423

Shedding in Implement Yard (in feet) [exclusive of open-ground space]	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897	Leicester, 1896	Darlington, 1895	Cambridge, 1894	Chester, 1893	Warwick, 1892
	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.
Ordinary . .	7,245	9,454	7,455	9,350	9,320	8,506	7,528	8,435	8,610	8,241
Machinery in motion .	2,305	2,547	2,192	3,239	3,334	2,732	2,718	2,539	2,211	2,151
Special Shedding (including seeds, models, &c.)	2,101	2,771	2,553	2,902	2,878	2,692	2,351	2,428	2,197	2,119
TOTAL . .	11,651	14,772	12,200	15,491	15,532	13,930	12,597	13,402	13,018	12,511
No. of Implement Stands	358	412	395	502	489	450	393	442	408	411

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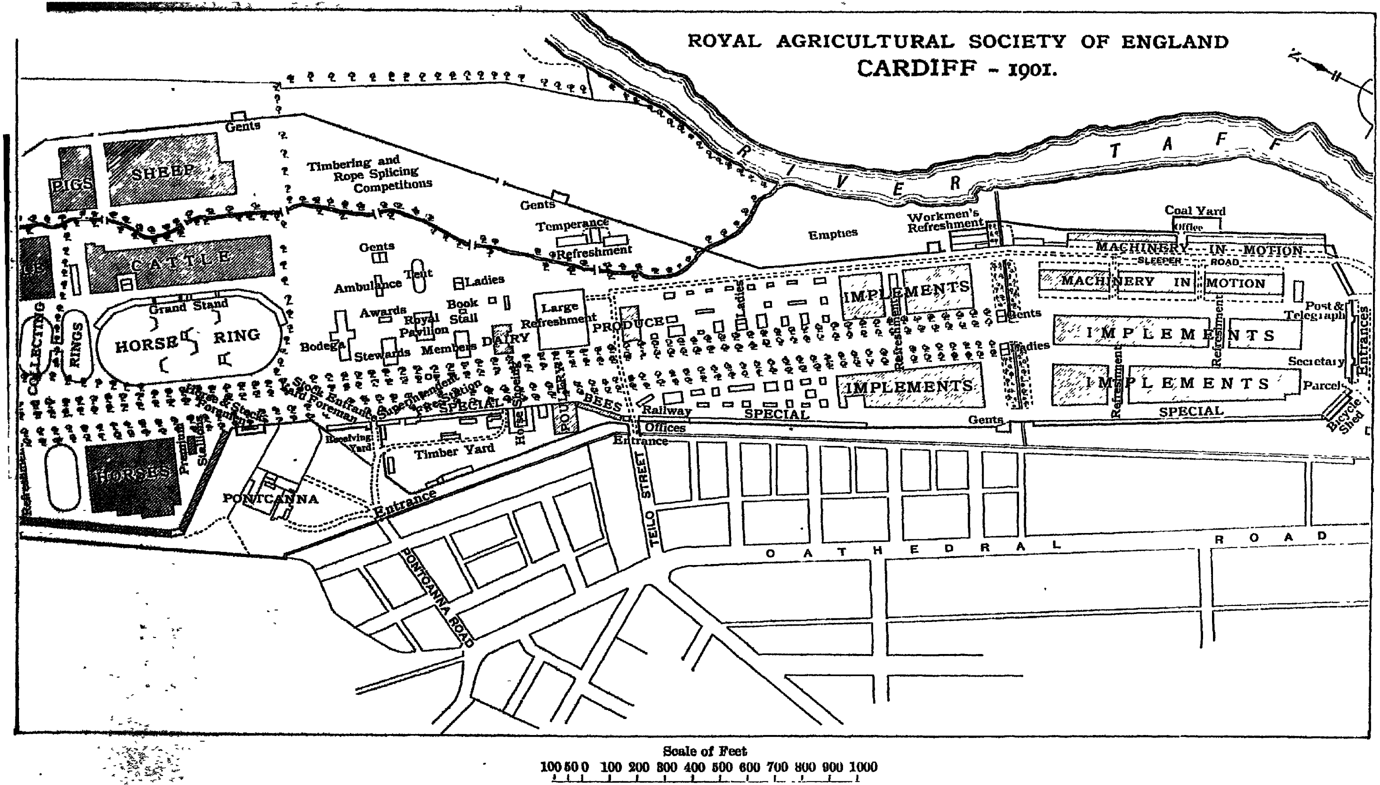
[1] Including 52 entries of goats in 1897, and 14 in 1892.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND
CARDIFF - 1901.



As was perhaps to be expected, Cardiff could not compete numerically as regards entries with localities more centrally situated or more conveniently accessible to breeders of live stock. It is noticeable that in both departments the entries are considerably below the average for the ten years. This is especially the case with regard to horses, which at Cardiff were 341 less than at York in 1900, and 243 below the average for the ten years.

THE TWO CARDIFF MEETINGS COMPARED.

In 1872 the Show was held in Cathays Park, then the property of Lord Bute, but since acquired by the Cardiff Corporation, and used partly for building purposes and partly for a recreation ground. The area of the Showyard was about 60 acres, as compared with the 90 acres which this year were necessary to properly accommodate all the departments of the Show. In 1872 no classes were provided for Cleveland Bays, Coach Horses, Shetland Ponies, Polo Ponies and Harness Horses, all of which were represented this year, in addition to the classes for Hunters, Hackneys, Ponies, and the three heavy horse breeds which appear in the prize sheets of both Meetings.

In the Cattle classes such English breeds as the Sussex, Longhorn, and Red Polled were not provided for, nor were any Scotch or Irish breeds. Amongst sheep, the Suffolk, Border Leicester, Kentish or Romney Marsh, Wensleydale, Devon Longwoolled, Dartmoor, Exmoor, Blackfaced Mountain, Herdwick, and Ryeland breeds had no separate classes in 1872; and in a single class for pens of ten ewes with their lambs of "any Longwool breed" there were but three entries made by two exhibitors. The pig classes exhibit less difference as between the two Shows. The principal differences are the provision of special classes for Middle Whites and for Tamworths in 1901, and the omission of the classes for Small Black pigs and for "Other Breeds" as provided in 1872. There were no classes for poultry in 1872, and only three for produce, these being limited to one class for butter and two for cheese.

In the Implement Department the Cardiff Show of 1872 was noteworthy for its important trials of portable steam engines, threshing and finishing machines, hay and straw elevators and corn screens. In 1901, scientific progress in this department is illustrated by the trials of portable oil engines and ice-making plant, and by the exhibition of sheep-shearing machinery and self-moving vehicles. A detailed comparison between the two Cardiff Shows of 1872 and 1901 in tabular form appears on the opposite page.

COMPARATIVE STATEMENT OF ENTRIES, &c.,

AT THE TWO MEETINGS HELD AT CARDIFF IN 1872 AND 1901.

IMPLEMENTS	**1872** (July 8-19)	**1901** (June 26-July 1)
Stands	308	358
Prizes offered	*£265*	*£435*

HORSES AND CATTLE	1872 Classes	1872 Entries	1901 Classes	1901 Entries
HORSES :—				
Prizes	—	*£1,065*	—	*£1,695*
Hunters	8	107	9	40
Cleveland Bays and Coach Horses	—	—	3	15
Hackneys	4	55	10	44
Ponies	4	16	4	21
Mountain, &c., Ponies			2	5
Shetland Ponies	—	—	2	10
Welsh Ponies	1	21	2	18
Polo Ponies	—	—	7	39
Harness Horses	—	—	4	28
Shire	4	55	7	68
Clydesdale	4	14	4	17
Suffolk	4	7	4	19
Colliery Horses	1	1	2	13
Draught Horses	4	36	3	18
Total for HORSES	34	314	63	355
CATTLE :—				
Prizes	—	*£1,215*	—	*£1,778*
Shorthorn	8	148	7	104
Lincolnshire Red Shorthorn	—	—	4	18
Hereford	8	95	7	76
Devon	8	43	6	32
Sussex	—	—	5	24
Longhorn	—	—	2	6
Welsh	7	28	7	37
Red Polled	—	—	5	28
Aberdeen Angus	—	—	4	33
Galloway	—	—	4	19
Highland	—	—	2	3
Ayrshire	—	—	2	6
Jersey	3	47	5	72
Guernsey	3	17	5	35
Kerry	—	—	3	18
Dexter	—	—	3	36
Other Breeds	4	18	—	—
Dairy Cattle	1	10	1	6
Total for CATTLE	42	406	72	553

SHEEP, PIGS, POULTRY, PRODUCE	1872 Classes	1872 Entries	1901 Classes	1901 Entries
SHEEP :—				
Prizes	—	*£905*	—	*£1,330*
Oxford Down	3	36	5	48
Shropshire	3	73	6	76
Southdown	3	57	5	76
Hampshire Down[1]	3	20	5	61
Suffolk	—	—	5	29
Somerset and Dorset Horned	3	11	2	8
Lincoln	3	37	6	49
Leicester	3	48	4	20
Cotswold	4	72	4	26
Longwools	1	3	—	—
Border Leicester	—	—	4	22
Kentish or Romney Marsh	—	—	2	15
Wensleydale	—	—	2	13
Devon Longwoolled	—	—	3	9
Dartmoor	—	—	2	8
Exmoor	—	—	2	4
Cheviot	3	15	2	7
Blackfaced Mountain	—	—	2	6
Herdwick	—	—	2	8
Welsh Mountain	2	1	3	20
Ryeland	—	—	2	11
Radnor	3	10	1	3
Total for SHEEP	34	383	69	519
PIGS :—				
Prizes	—	*£285*	—	*£396*
Large White	4	29	4	34
Middle White (*See Other*	*Breeds*)	—	4	22
Small White	4	44	4	12
Berkshire	4	87	4	51
Tamworth	—	—	4	22
Large Black (*See Other*	*Breeds*)	—	2	7
Small Black	4	20	—	—
Other Breeds	3	16	—	—
Total for PIGS	19	196	22	148
TOTAL FOR STOCK	Classes 129	Entries 1293	Classes 226	Entries 1,575
POULTRY :—				
Prizes	—	—	—	*£852*
Entries	—	—	90	701
PRODUCE :—				
Prizes	—	*£44*	—	*£248*
Entries	3	60	17	521

Grand Totals for LIVE STOCK, POULTRY, and PRODUCE			
1872	132 Classes	1,353 Entries	£3,664[2] Prizes
1901	*357* „	*2,797* „	*£5,975*[3]

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[1] Including other Shortwools in 1872.

[2] Including £150 for Farm Prizes.

[3] Including £277 for Competitions.

THE SHOW.

As a general rule, it is found convenient to hold the Society's Show during the first five days of the same week, the Implement Department and Dairy only being open on the previous Saturday. When visiting large industrial centres, however, as at Manchester in 1897, and other similar localities, this rule is sometimes departed from, and the date of the Show is fixed so that the two Shilling Days fall on the Saturday and Monday—days found most generally convenient for the working classes to take a holiday. This plan was followed at Cardiff, and all departments of the Show opened on Wednesday, June 26, when the day was devoted to the judging of the various descriptions of live stock and produce.

The Judges, of whom there were 103, assembled as usual in the large tent at 8.30 in the morning, and after receiving the necessary directions from the Honorary Director, Mr. Percy Crutchley, proceeded at once with their duties. By the end of the day the whole of the awards were completed and published.

On Thursday, June 27, the General Meeting of Governors and Members was held in the large tent, when cordial votes of thanks were passed to the Cardiff Corporation and the Local Committee. The Chair was occupied by the President (Earl Cawdor), and the principal resolution, a vote of thanks to the Mayor and Corporation of Cardiff, was proposed by H.R.H. Prince Christian, who attended the Show in his capacity as President-Elect. A full report of the proceedings at this meeting appears in the Appendix.

Friday, June 28, was signalised by two interesting events, one the visit to the Show of the special Ambassador from the Sultan of Morocco (Cid El Mehedy El Menebhi) with his suite, and the other a luncheon at the Town Hall, given by the Mayor in honour of Prince Christian and the Council of the Society.

Parades in the Large Horse Ring of the Prize Cattle and Horses were held daily after the completion of the judging. Demonstrations of Butter- and Cheese-making were given in the Dairy on Wednesday by Miss Brown, and lectures and demonstrations of Bee Management were given in the Bee Department organised by the British Bee-keepers' Association.

A Lecture on "The Horse's Foot and How to Shoe it" was given at the Shoeing Forge on Saturday, June 29, by Mr. John Malcolm, F.R.C.V.S. From the Thursday until the close of the

Show the Band of the Royal Marines (Plymouth Division) gave excellent musical performances that were greatly appreciated by those who listened to them.

Owing to the change of date, the Showyard Sunday, instead of preceding the opening day, fell this year towards the close of the Show. Divine Service was held in the large tent, and the Bishop of Llandaff (the Right Rev. Richard Lewis, D.D.) preached to a large congregation of officials, grooms, herdsmen, and shepherds, taking his text from verses 6 and 7 of the ninety-fifth Psalm.

THE WEATHER.

The weather, upon which the success of a Royal Show so much depends, was for most of the time excellent, and typical of an English midsummer at its best. Rain which fell before the opening of the Show had made the turf soft underfoot, and the grass refreshingly verdant. From the first day of the Show up to Saturday warm and brilliant sunshine, tempered by cooling breezes, prevailed. Saturday, though fine, became sultry, and ended with a severe thunderstorm, which happily did not break until after the Show had closed. On Monday, the last day of the Show, the weather was dull and damp, but the rain did not actually descend until late in the afternoon. But for the uncertain weather, the attendance on the last day, fair though it was, would doubtless have been greatly exceeded.

THE ATTENDANCE.

As regards the attendance of the general public throughout the Show week, Cardiff stands out in marked and satisfactory contrast to the three Shows which immediately preceded it; and in some respects the turnstile figures constituted a record. On the opening day of the Show the number of persons paying the five shilling entrance money was 3,155, a total far in excess of the average of the corresponding day in previous years. Indeed, the total for this day has only been exceeded twice within the last ten years—viz. at Manchester in 1897, when the visitors numbered 4,547, and at Warwick in 1892, when they reached 3,570. The attendance on the half-crown days was 23,745 and 25,063, respectively. The latter figure has been exceeded on a half-crown day only twice during the Society's existence, viz. on the first half-crown day at Liverpool in 1877, when the attendance was 25,074, or but eleven more than the Cardiff total, and at Manchester in 1869 when the attendance was 39,405. The latter figure is not, however, strictly comparable with the Cardiff total, inasmuch as at Manchester in

1869 there was but one half-crown day instead of two. The attendance figures of the two half-crown days at Cardiff added together make a total of 48,808, which has never been reached on the corresponding days of any previous Show. The following Table will make clearer the relative positions of the Cardiff and previous Shows in respect of attendance on the half-crown days:—

Place	Year	First 2*s.* 6*d.* day	Second 2*s.* 6*d.* day	Total
Cardiff	1901	23,745	25,063	48,808
Liverpool	1877	25,074	22,981	48,055
Manchester	1897	22,418	21,473	43,891
Windsor	1889	18,809	24,690	43,499
Bristol	1878	19,223	22,404	41,627
Preston	1885	21,713	19,318	41,031

The total number of paying visitors for the week was 167,423, an aggregate that has only been exceeded on three previous occasions, viz. at Manchester in 1869 (189,102) and 1897 (217,980), and at the Kilburn International Show in 1879 (187,323).

The Table on page 121 gives a comparative statement of the admissions to the Showyard by payment for the ten years, 1892 to 1901, and for the first Cardiff Meeting of 1872.

In the Implement Department the Prizes offered were for Portable Oil Engines and for Ice-making Plant; and the trials of the competing machines took place immediately before the opening of the Show. Special Reports of these trials, from the pen of Professor Ewing, F.R.S., will be found at pages 158 and 180. Similarly, a Report by Mr. C. P. Hall on the Miscellaneous Implements exhibited appears at page 191.

The Reports received from the Judges of Live Stock have been summarised, and quotations or abstracts from them are given, with statistical details of the various breeds and classes. A complete list of the official awards is given in the Appendix, preceded by the names of the Stewards and Judges in the different departments.

Photographs of the male winners of Champion Prizes in the classes for Horses and Cattle were taken for the Society in the Showyard at Cardiff by the animal photographer, Mr. C. Reid of Wishaw, and these are now reproduced as illustrations to this Report.

COMPARATIVE STATEMENT OF ADMISSIONS

TO THE SHOWYARD BY PAYMENT FOR THE YEARS 1892–1901 AND 1872

(*Excluding Members, Exhibitors, Season Ticket Holders, &c.*).

—	Cardiff, **1901**	York, **1900**	Maidstone, **1899**	Birmingham, **1898**	Manchester, **1897**	Leicester, **1896**	Darlington, **1895**	Cambridge, **1894**	Chester, **1893**	Warwick, **1892**	Cardiff, **1872**
Implement yard only	—	157	183	256	—	172	574	260	299	266	[1] 1,144

FIVE SHILLING (JUDGING) DAY.

—	Cardiff, **1901**	York, **1900**	Maidstone, **1899**	Birmingham, **1898**	Manchester, **1897**	Leicester, **1896**	Darlington, **1895**	Cambridge, **1894**	Chester, **1893**	Warwick, **1892**	Cardiff, **1872**
11 A.M. .	606	1,091	352	734	865	592	1,020	526	739	857	408
1 P.M. .	1,622	1,742	778	1,689	2,685	1,329	1,890	1,372	1,867	2,602	1,318
3 " .	2,758	2,154	983	2,263	3,950	1,698	2,113	1,796	2,297	3,367	1,726
5 " .	3,152	2,233	1,044	2,441	4,518	1,797	2,167	1,855	2,389	3,562	1,799
Day's total	3,155	2,233	1,050	2,462	4,547	1,801	2,172	1,879	2,397	3,570	1,800

FIRST HALF-CROWN DAY.

—	Cardiff, **1901**	York, **1900**	Maidstone, **1899**	Birmingham, **1898**	Manchester, **1897**	Leicester, **1896**	Darlington, **1895**	Cambridge, **1894**	Chester, **1893**	Warwick, **1892**	Cardiff, **1872**
11 A.M. .	5,339	4,482	2,134	2,985	3,204	4,516	5,997	4,488	5,175	5,611	2,151
1 P.M. .	14,138	8,692	6,794	7,364	12,351	11,513	10,852	10,586	15,985	13,196	6,127
3 " .	21,777	10,890	8,611	9,447	19,302	16,692	11,745	12,818	19,917	15,928	8,898
5 " .	23,577	11,320	8,904	10,438	21,905	17,367	12,027	13,129	20,855	16,574	8,877
Day's total	23,745	11,333	8,928	10,492	22,418	17,409	12,046	13,152	20,959	16,598	8,901

SECOND HALF-CROWN DAY.

—	Cardiff, **1901**	York, **1900**	Maidstone, **1899**	Birmingham, **1898**	Manchester, **1897**	Leicester, **1896**	Darlington, **1895**	Cambridge, **1894**	Chester, **1893**	Warwick, **1892**	Cardiff, **1872**
11 A.M. .	6,628	4,751	1,886	4,267	4,595	7,667	10,219	5,735	5,820	5,454	3,603
1 P.M. .	16,148	9,436	5,718	12,873	11,589	15,936	21,369	13,803	13,911	12,193	8,907
3 " .	22,678	11,822	7,801	20,181	18,258	20,655	24,516	17,298	18,082	14,896	11,578
5 " .	24,984	12,320	8,507	22,130	21,208	21,697	24,927	17,865	18,985	15,735	12,085
Day's total	25,063	12,332	8,572	22,317	21,473	21,735	24,942	17,890	19,034	15,779	12,124

FIRST SHILLING DAY.

—	Cardiff, **1901**	York, **1900**	Maidstone, **1899**	Birmingham, **1898**	Manchester, **1897**	Leicester, **1896**	Darlington, **1895**	Cambridge, **1894**	Chester, **1893**	Warwick, **1892**	Cardiff, **1872**
11 A.M. .	19,951	20,146	12,708	10,917	8,812	21,464	20,166	27,904	17,166	9,710	11,984
1 P.M. .	43,323	37,315	25,903	26,560	21,699	53,086	30,309	50,524	41,301	24,628	26,543
3 " .	60,412	48,809	30,633	39,761	44,838	75,323	41,962	61,618	56,389	33,580	35,556
5 " .	68,557	52,310	35,106	48,083	70,967	80,362	43,006	63,761	59,403	36,265	38,538
Day's total	69,133	52,488	35,249	49,011	73,119	80,602	43,073	63,981	59,555	36,448	38,918

SECOND SHILLING DAY.

—	Cardiff, **1901**	York, **1900**	Maidstone, **1899**	Birmingham, **1898**	Manchester, **1897**	Leicester, **1896**	Darlington, **1895**	Cambridge, **1894**	Chester, **1893**	Warwick, **1892**	Cardiff, **1872**
11 A.M. .	12,403	3,008	3,461	2,615	11,812	7,967	9,085	6,258	4,889	9,118	5,699
1 P.M. .	29,666	6,272	8,565	6,939	34,710	16,925	14,486	11,312	8,774	19,036	15,365
3 " .	41,616	8,295	12,752	9,948	60,578	22,048	16,758	13,703	12,712	22,503	19,988
5 " .	45,886	8,924	14,412	13,510	72,616	24,401	17,473	14,418	13,629	23,703	21,796
Day's total	46,327	8,968	14,594	13,739	73,802	24,558	17,503	14,496	13,664	23,801	22,289
Total No. of paying visitors .	167,423	87,511	68,576	98,277	217,980 [2]	146,277	100,310	111,658	115,908	96,462	85,185

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[1] From Monday, July 8, to Saturday, July 13, 1872.

[2] Manchester, 1897. There was this year a third shilling day (22,621).

HORSES.

Not since the Plymouth Meeting of 1890 has there been such a small entry of Horses at the Royal Show. The entries numbered only 355, and of these no less than 79 were absent. The Hunters were poor both in quality and numbers. Numerically, the Shires led with sixty-eight entries, followed by the Hackneys with 44 entries.

Entries of Horses at the last Five Meetings, 1897–1901.

—	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897
PRIZES OFFERED	£1,695	£2,505	£1,835	£2,416	£3,588
	No.	No.	No.	No.	No.
Hunters	40	154	50	157	197
Hacks	—	3	—	—	—
Cleveland Bays	15	42	19	22	23
Coach Horses		63		18	17
Hackneys	44	115	55	103	183
Ponies	21	41	20	42	79[1]
Mountain and Moorland Ponies	5	11	11	23[1]	—
Polo Ponies	39	41	47	69	95
Shetland Ponies	10	11	21	—	—
Welsh Ponies	18	—	—	—	—
Harness Horses and Ponies	28	31	34	40	73
Shires	68	76	90	135	172
Clydesdales	17	30	27	34	51
Suffolks	19	45	42	39	44
Colliery Horses	13	—	—	—	—
Draught Horses	18	33	8	27	47
Agricultural Geldings					
Total Entries of Horses	355	696	424	709	981

[1] Including Shetland Ponies

LIGHT HORSES.

Thoroughbred Stallions.—The four Thoroughbred Stallions, which gained the King's Premiums at the Islington Spring Show last March and which served in District F, were exhibited in the Showyard at Cardiff; and, following precedent, their owners received a Gold Medal (or the sum of 10*l.*) from the Cardiff Local Committee. The horses were *Alvin*, belonging to Mr. L. J. Shirley of Ely, Glamorganshire; *Faute-de-Mieux*, belonging to Mr. S. Mumford of Moreton Morrell, Warwickshire; *Swallowfield*, belonging to Mr. F. W. Barling of Ross, Herefordshire; and *Toboggan*, belonging to Mr. G. L. Abbot of Abbot's Leigh, Bristol.

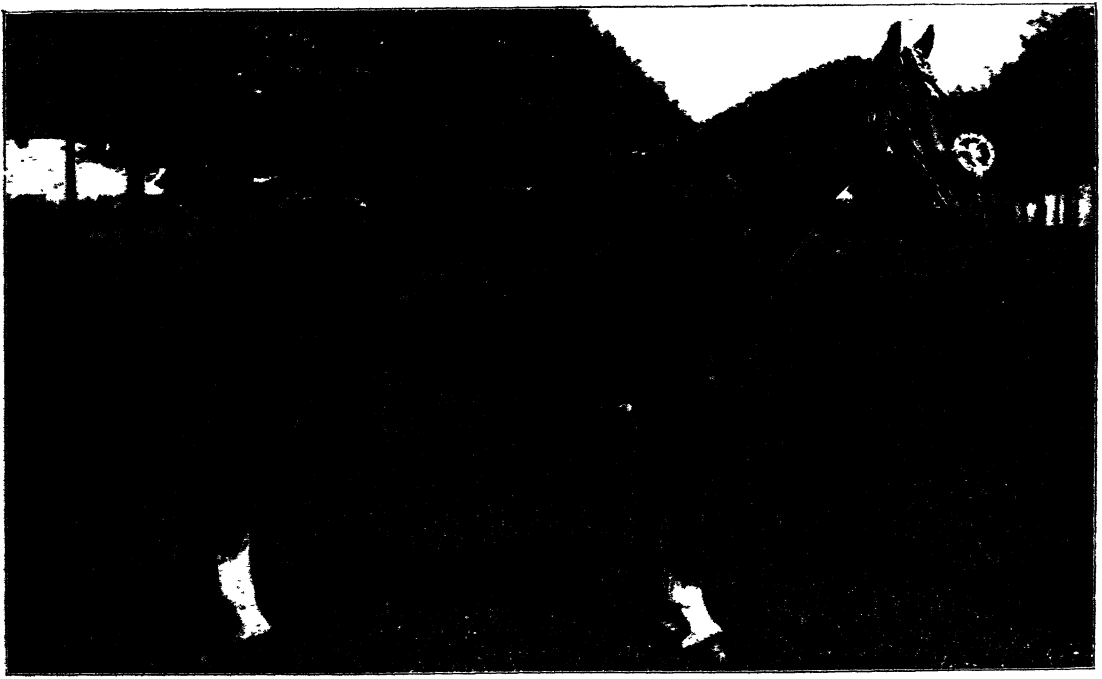

Fig. 1. Hackney Stallion, "Bonny Danegelt." 6990.

Winner of Champion Prize for best Hackney Stallion, Cardiff Meeting, 1901 *Exhibited by Sir WALTER GILBEY, Bart*

Hunters.—Only 40 entries were made in the nine classes; but not more than 24 actually appeared in the judging-ring. Classes 1, 3, 5, 6 and 7 are described by the Judges as "poor throughout and the quality moderate." The Judges of Classes 2, 4, 8 and 9 express extreme disappointment at the small number of entries, which they attribute in a great measure to the time the exhibits have to remain in the Show.

Cleveland Bays and Coach Horses.—Of these there were 15 entries in three classes. The three animals exhibited in Class 10, for three-year-old stallions, were a good type of the breed. Class 11, for two-year-old stallions, was the best filled, and all six animals passed the veterinary examination. Of the four mares in Class 12, all but one were placed, and thus maintained their reputation as prize-winners at local shows in their own county.

Hackneys.—Ten classes were devoted to Hackneys, but they comprised only 44 entries. Sir Walter Gilbey secured the male championship with *Bonny Danegelt*, whose portrait is given on page 123, and Mr. Frederick Wrench the reserve male championship with *Fitz Rose*, both animals the offspring of Sir Walter's *Royal Danegelt.* The female championship fell to Mr. Harry Livesey, for *Orange Blossom* by *Connaught*, and the female reserve championship to Mr. John Makeague, for *Hermione* by *Chocolate Junior.* The following is the report of the Judges:—

HACKNEYS on the whole were very short in entries; some few good animals were shown in most of the classes.

CLASS 13 (three-year-old stallions 15 hands 1 inch and upwards).—One of the best classes amongst the Hackneys: the first prize horse a good type of Hackney, showing more substance and stallion character than the second. He afterwards easily took the championship of the stallions.

CLASS 14 (stallions foaled 1897 or 1898, above 14 and under 15 hands 1 inch).—Of moderate merit: the winner was the best goer of a small class.

CLASS 15 (two-year-old stallions).—The winner was more of a Hackney, and after a tight fight won, and was afterwards placed reserve for champion.

CLASS 16 (yearling stallions).—The winner a promising colt, and far ahead of the class.

CLASS 17 (mares 15 hands and upwards).—The best class in the section. The first an easy winner, combining the attributes of a good Hackney brood mare.

CLASS 18 (mares above 14 and under 15 hands with foals at foot).—Only two present. The winner won by her superior action.

CLASS 19 (three-year-old fillies).—The winner was an easy first, and perfect type of a Hackney, consequently was reserve for champion.

CLASS 20 (two-year-old fillies).—Only two, of very equal merit, the first, showing more character, is likely to make the best brood mare.

CLASS 21 (mares or geldings foaled 1895, 1896, or 1897, to carry 15 stone

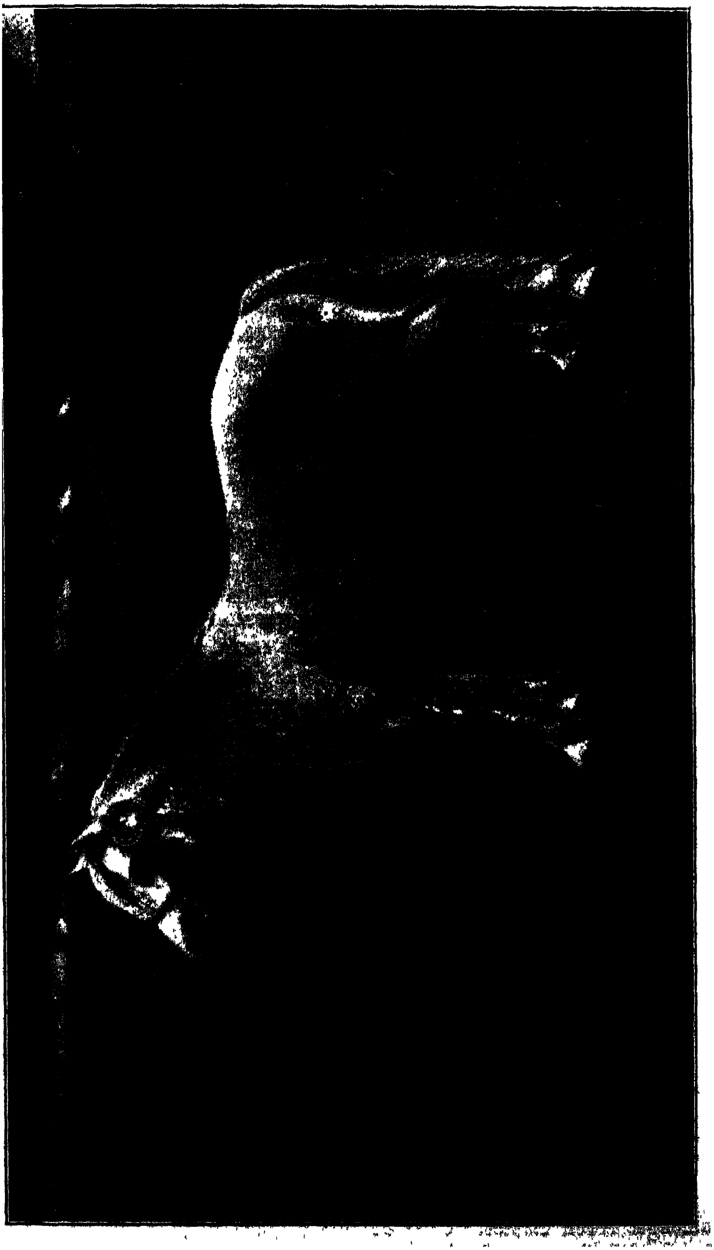

FIG. 2. WELSH MOUNTAIN PONY STALLION, "STARLIGHT." 167.

Winner of Champion Prize for best Welsh Mountain Pony, Cardiff Meeting, 1901 Exhibited by Mr. H. MEURIC LLOYD.

and upwards).—The winner an easy first, a good mover and a first-rate type of a weight-carrying Hackney.

CLASS 22 (mares or geldings, foaled 1895, 1896, or 1897, to carry 12 stone and under 15 stone).—There was but one entry present, which received the first prize.

Ponies.—Of these there were 21 entries in the four classes. Class 23, for stallions not over 14 hands, consisted of five animals, and all except one passed the veterinary examination. The first and second prize ponies had "correct type and action." The reserve number was awarded to a "stronger type of pony of Welsh character." Only two mares were present in Class 24, but they received the first and second prizes, the first prize pony being "a particularly nice one." Class 25, for mares and geldings, brought together a useful lot of ponies, and as the animals had to be ridden, the ponies most suitable for this purpose were selected by the Judges.

Shetland Ponies.—In the two classes there were entered five stallions and five mares. The stallions were "of a superior class," and all three prizes were awarded. The four mares present were a "thoroughly typical lot, showing good, true, sharp action."

Mountain and Moorland Ponies.—The two classes contained two stallions and three mares. The former were of "quite different character"; but the first prize was awarded to a "beautiful pony full of quality, and just the sort to improve the breed." The reserve stallion was "a useful pony, more of cob character." Only one of the mares, which received the first prize, was "considered to fulfil the condition of the class." No other award was therefore made.

Welsh Mountain Ponies.—The prizes for Welsh Ponies were provided by the Cardiff Local Committee, and attracted 18 entries, viz. 6 stallions and 12 mares. The champion pony, *Starlight*, a beautiful grey, bred and exhibited by Mr. H. Meuric Lloyd, is the subject of the illustration on page 125. The Judges reported as follows: —

CLASS 31 (stallions).—This was a good class. The first prize was awarded to a grey pony, which we consider nearly a perfect specimen of the breed. We afterwards awarded him the champion prize for the best pony in Classes 31 and 32. The second prize pony was of great merit, but of rather a stronger character.

CLASS 32 (mares).—This was an excellent class. We took great pains to keep a similar type through all the awards, and we consider the ponies we selected were correct specimens of the Welsh Mountain breed.

Polo Ponies.—The Polo Ponies numbered 39, distributed amongst seven classes. Class 33, for stallions not above 14 hands 2 inches, contained four exhibits, including Sir Walter

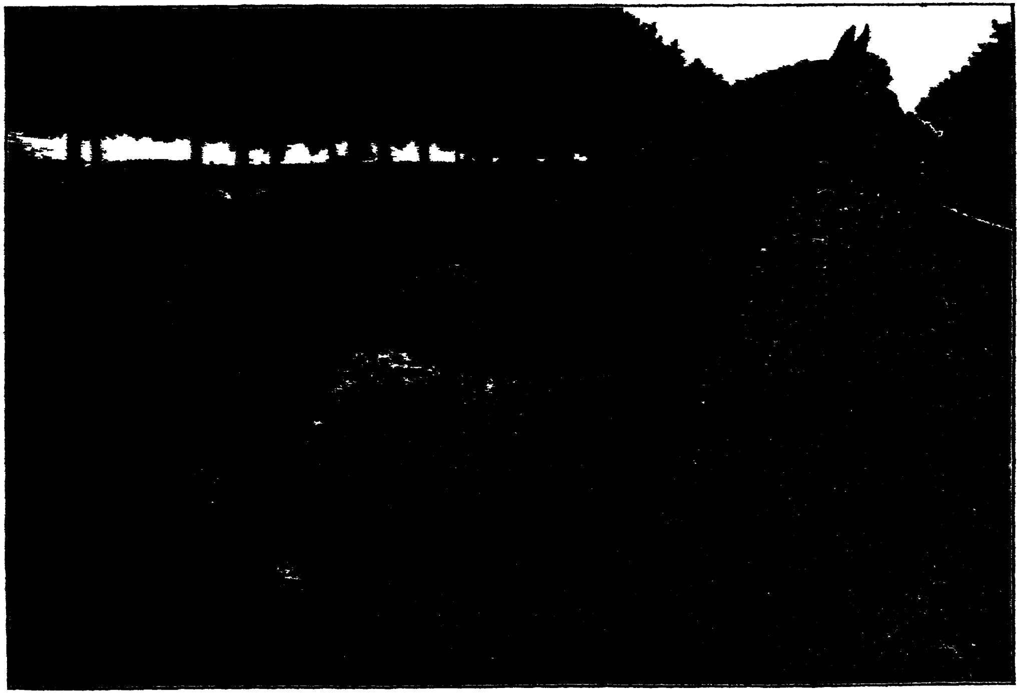

Fig. 3. Polo Pony Stallion, "Rosewater." 37.

Winner of Champion Prize for best Polo Pony Stallion Cardiff Meeting, 1901. *Exhibited by Sir WALTER GILBEY Bart*

Gilbey's *Rosewater*, which was an easy winner of the first prize and also of the male championship. A photograph of this famous Polo stallion, with which Sir Walter has now taken the male championship at the Royal Show for four years in succession—in fact ever since classes were first provided for Polo Ponies in 1897—is reproduced on page 127. The second prize in Class 33 went to a "nice stamp of stallion," Mr. Midwood's *Rudheath*, to which was also awarded the reserve number for the male championship. Class 34, for stallions (Eastern Ponies) not over 14 hands 2 inches, had only two entries, which received the first and second prizes respectively.

In Class 35, for mares above 13 hands 2 inches and not exceeding 14 hands 2 inches with foals at foot, there were six entries, with which as a whole the Judges were not impressed, although the first prize animal and reserve for championship, Mr. John Barker's *Lightning*, is described as "a nice class of blood Polo Pony, with a nice foal." The second prize, *First Flight*, exhibited by the Keynsham Stud Company, is "a good stamp of weight-carrying Polo Pony." In the opinion of the Judges, ponies of 13 hands 2 inches are "too small to breed the present type of Polo Pony from." Class 36, for mares not exceeding this height, contained, however, amongst the four mares in the ring the champion mare, *Zither*, exhibited by the Rev. D. B. Montefiore; and the Judges described it as "a very nice cut of a Polo Pony, being more on Polo lines than the mares in the larger class."

Class 37, for three-year-old colts, geldings, or fillies not exceeding 14 hands 1 inch, also contained four animals. Class 38, for two-year-old colts, geldings, or fillies not above 14 hands, was the best of the section, with nine entries. The first prize went to a filly with "plenty of bone," and the second to a gelding with a "lot of quality, but rather flat-sided." Class 39, with eight entries of yearling colts, geldings, and fillies, was also a good one. The first prize went to a filly and the second to a colt, both exhibited by Sir Humphrey de Trafford, "quick on their legs, with nice quality, and likely to grow into the best class of Polo Pony"; these animals were both by *Eheu* out of different dams by the champion, *Rosewater*.

Harness Horses and Ponies.—Twenty-eight entries were made in four classes. The following is the report of the Judges:—

CLASS 40 (mares or geldings above 15 hands 2 inches).—Only a first and reserve number was given in this class, there being only two animals present.

CLASS 41 (mares or geldings above 15 and not above 15 hands 2 inches).—Only one horse was present, which received a second prize.

CLASS 42 (mares or geldings above 14 and not above 15 hands).—There were 13 entries in this class, all of which came before us except four. A good class. The first prize mare went with great force and won easily The second prize animal was a well-made one, and showed quality with the right sort of action.

CLASS 43 (mares or geldings not above 14 hands).—This was one of the best classes we judged, the first prize pony being conspicuous for her true action—going with great force from her hocks. There were only five entries, but we recommended the third prize to be given, owing to merit.

HORSE-JUMPING COMPETITIONS.

An entirely new departure was made this year by the introduction into the Showyard of Horse-jumping Competitions, which have never previously been held by the Society, although in 1869 competitions of this kind were organised in connection with, but independently of, the Manchester Meeting of that year, when they attracted large crowds.

The experiment at Cardiff was not entered upon without some misgivings, and an important discussion on the subject took place at the Council Meeting on December 12, 1900 (see Vol. for 1900, Appendix, page ccii). On the one hand, it was argued that as the success of the Society's Shows was dependent upon public support, it was justifiable to adopt means to make them more popular, and that such competitions, if properly organised, would tend to improve the leaping capabilities of good hunters. On the other hand, it was argued that the Society's Shows were not intended as places of mere public amusement, but to interest and instruct the agricultural and general public in the various departments of British agriculture. The decision of the Stock Prizes Committee in favour of the Competitions was upheld in the Council by 22 votes to 13; and the jumping accordingly took place in the large ring at Cardiff immediately after each day's parade of the Light Horses, proving certainly a highly attractive feature of the Show.

Prizes amounting to 180*l*., to which were added the entry fees received, were provided by the Cardiff Local Committee; and the classes arranged were as follows:—

CLASS A.—Animals exhibited in Classes 3, 4, and 5.

CLASS B—Mares or geldings, 15 hands 2 inches and over.

CLASS C.—Mares or geldings, above 14 hands 2 inches and under 15 hands 2 inches.

CLASS D.—Pony mares or geldings, 14 hands 2 inches and under

The course consisted of: (1) Bush Fence; (2) Hurdel; (3) Double (in-and-out) Jump; (4) Post and Rail; (5) Stone Wall; and (6) Fence and Water Jump.

For Class A, in which the horses were subject to veterinary examination, no entries were received. Class D was therefore taken on the Thursday, when there were six competitors; on Friday Class B, with thirteen horses, competed, and on Saturday Class C, with six horses. For Monday, the last day of the Show, a Consolation Class was arranged for the competitors who were unsuccessful in gaining prizes on the previous days, and nine entered.

Although the course was a somewhat stiff one, and the weather on the last day made the ground slippery, there were fortunately no accidents of a serious character. Amongst the competing horses were several noted prize-winners at other Shows, including Mrs. Blockley's brown gelding "Omega" which took the first prize in Class B, and Mr. Charles A. Daniell's roan gelding "Newcastle," which, although receiving only reserve number on Friday, took all the leaps in grand form on the last day of the Show, and gained the Consolation Class first prize.

HEAVY HORSES.

Shires.—These numbered 68 entries in seven classes, the best filled being the two-year-old and the yearling fillies and the three-year-old stallions. Some of the other classes were rather short in numbers, but the Judges consider that the show of Shires was on the whole very good, and excellent in quality. They report on the various classes as follows:—

CLASS 44 (three-year-old stallions).—Six very good horses, the first and second being of exceptional merit.

CLASS 45 (two-year-old stallions).—Small class; one very good animal in the first prize-winner.

CLASS 46 (yearling stallions)—The winner very useful.

CLASS 47 (mares).—Three very good animals. The champion a clear winner. We strongly recommend that all three prizes be awarded.

CLASS 48 (three-year-old fillies).—Short numbers. Very useful class.

CLASS 49 (two-year-old fillies).—This was a strong good class. The first prize-winner was reserve number for champion, and has great weight and substance.

CLASS 50 (yearling fillies).—A large good class of great merit, containing many animals of excellent quality and substance.

The Male Championship was secured by Messrs. W. & J. Thompson for *Desford Combination* (see page 131), and the Female Championship by Mr. Fred Crisp for *Southgate Charm*.

Clydesdales.—Only 17 animals were entered for the four classes. The three animals in the class for three-year-old stallions were of very equal merit, and all three prizes were awarded. Amongst the two-year-old stallions were some fine specimens of the breed, the first prize horse, *Silver Cup*, shown

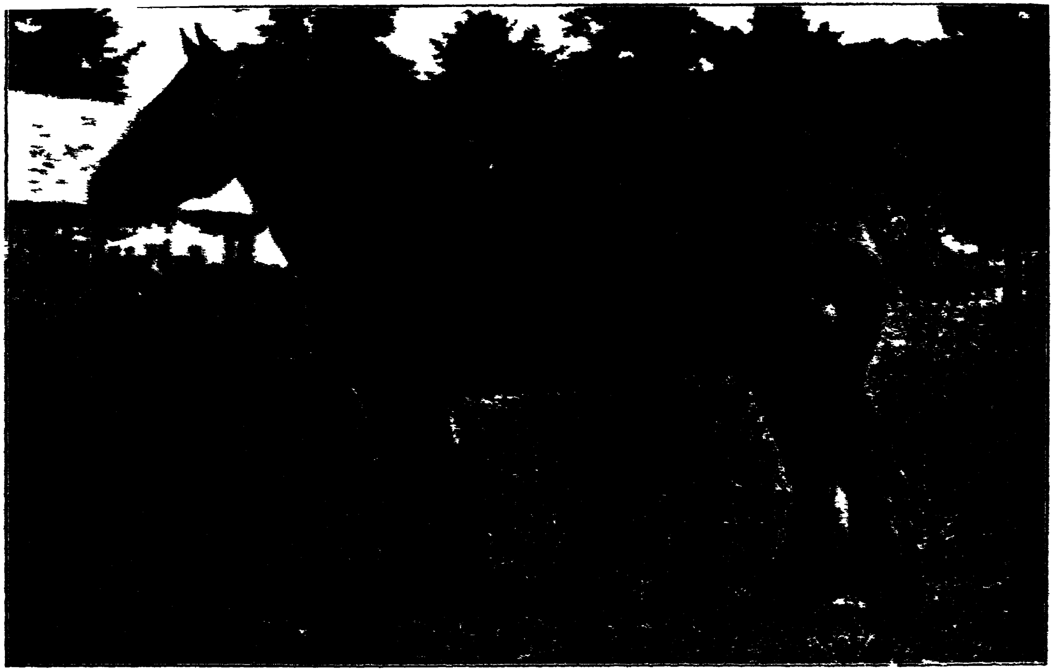

FIG. 4. SHIRE STALLION, "DESFORD COMBINATION." 17934

Winner of Champion Prize for best Shire Stallion, Cardiff Meeting, 1901 *Exhibited by Messrs W & J THOMPSON* by the Seaham Harbour Stud, Limited, being described by the Judges as "quite the best horse of his age exhibited this season." The mares were "very moderate specimens"; but the fillies were an uniform class, and all of them excellent specimens of the breed.

Suffolks.—As in the case of the Clydesdales, the distance of the Show from the home of the breed militated against a large entry, and there were but 19 entries in the four classes—less than half of the average for recent years. The Judges report that "in the class for two-year-old stallions, the first prize animal was one of exceptional merit, that has always occupied the same position during his Show career. The three-year-old fillies were also a good class, the first prize going to a heavy mare with plenty of size and quality, closely followed by the second, which had good feet and joints."

Colliery and Draught Horses.—Five classes were provided for mares or geldings, the prizes being offered by the Cardiff Local Committee. The animals were exhibited on the Saturday only, and after the prizes had been adjudged, were paraded with the Heavy Horses the same morning. The Colliery Horses were divided into two classes, for animals above 14 hands 2 inches, and not exceeding 15 hands 2 inches, and for animals not above 14 hands 2 inches. In the former class were 13 entries, 9 being placed; but no entries were forthcoming for the second class. Cart Horses were in two classes for four-and three-year-olds respectively, and there were four entries in each class. For the remaining class, horses "suitable for a builder, brewer, timber-merchant, tradesman, haulier, railway or corporation," 10 entries were made, the first two prizes going to Messrs. Corker & Bevan of Swansea, and the third prize to the executors of the late Mr. John Moon of Cardiff.

CATTLE.

Though not quite to the same extent as Horses, the Cattle at Cardiff were numerically a long way behind the average, making a total of but 553. Shorthorns numbered 104. Herefords, being so near their native home, were strongly in evidence, the number being considerably over average. The same applies to the Welsh Black Cattle. The Scotch breeds were weak in numbers, especially the Highland Cattle and Ayrshires. The Irish Cattle made an excellent numerical display, all being shown by English exhibitors, except one that came direct from Kerry. It is a little difficult to account for the large falling off in the Channel Islands Cattle; they were scarcely more than half the average of nrece years.

Entries of Cattle at the last Five Meetings, 1897–1901.

—	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897
PRIZES OFFERED	£1,778	£1,755	£1,770	£1,716	£2,105
	No.	No.	No.	No.	No.
Shorthorns	104	162	128	188	184
Lincolnshire Red Shorthorns	18	—	—	—	—
Herefords	76	56	57	60	60
Devons	32	23	35	38	51
Sussex	24	25	68	28	25
Longhorns	6	8	9	22	—
Welsh	37	23	18	21	32
Red Polled	28	34	33	27	38
Aberdeen Angus	33	63	46	56	46
Galloways	19	24	15	24	29
Highland	4	40	—	—	3
Ayrshires	5	9	13	19	21
Jerseys	72	121	143	158	149
Guernseys	35	65	67	79	61
Kerries	18	9	11	18	17
Dexters	36	14	16	22	27
Dairy Cattle	6	11	24	32	78
Total Entries of Cattle	553	687	683	792	821

An important change in the Cattle Section of the Prize Sheet, by which the classes for female animals of three years old and upwards were limited to cows "in-milk," instead of being open as formerly to cows either "in-milk" or "in-calf," took effect this year at Cardiff.

Shorthorns.—There were 104 entries in seven classes, all being fairly well filled excepting the two allotted to cows in-milk. The class for two-year-old bulls was the one best filled, 18 animals being present in the ring. The yearling bulls originally totalled 28 entries, but half of them were absent. The Male Championship was taken for the second year in succession by *Royal Duke*, exhibited by His Majesty The King, and the Female Championship was awarded to Mr. Deane Willis's *White Heather*. The photograph of His Majesty's prize Bull, *Royal Duke*, is reproduced on page 135. The Judges presented the following report:—

Shorthorns upon the whole were fully up to the average standard, though there were fewer animals of outstanding superiority than in some former years. The general outlines of many of the exhibits were very meritorious, though sundry otherwise excellent frames were marred by either a weak head, plain or badly shaped horn, or by a badly set on tail. In these respects only can the Show be said to have been inferior to any of previous years. In the older bull class there were some half-dozen animals of great merit, headed by Nos. 356 and 357, *Royal Duke* and *Pride of Collynie*, which were ultimately chosen as champion and reserve champion respectively. *Royal Duke's* level top line, well arched rib, level flesh and straight, well-packed quarters gained him the preference over his more massive opponent, whose drooping quarters detracted from his otherwise great merits.

CLASSES 65 and 66.—The two-year-old and yearling bull classes were well filled with many promising animals of such equal merit that there was some little difficulty in selecting the prize-winners. The deficient extremities above referred to were most noticeable in these classes, and detracted greatly from the usual great excellence which animals of these ages have shown on former occasions

CLASS 67.—The cows were a small class, but of great individual merit, though the milking properties were not so well developed as desired nowadays.

CLASS 68.—The three-year-old heifers were also few in number, for which probably the requirement that they must be in-milk may account. But the champion female was found amongst them in No. 429, *White Heather*, an animal of very symmetrical outlines, good quarters, sweet head, and beautifully curved horns, and withal showing good milking capabilities.

CLASSES 69 and 70.—The two-year-old and yearling heifer classes contained many very level, well developed and promising animals, which will probably be seen at future Shows, and which will well sustain the reputation of the breed.

Lincolnshire Red Shorthorns.—This variety of cattle, known colloquially as "Lincoln Reds," for which classes were this year provided for the first time, is said to have been developed from the original cattle of Lincolnshire by the successful efforts of Thomas Turnell, a breeder who lived at Reasby, near Wragby, towards the close of the eighteenth century, and by the introduction of three Shorthorn bulls, purchased at Charles Colling's sale in 1810. Within recent years the breed has been still further improved by admixture with pure Shorthorn blood. The cattle are thus described by Mr. F. I. Cooke in his report on the Farm Prize Competition in Nottinghamshire and Lincolnshire in 1888 :—

> The prevailing breed of cattle is the Shorthorn, although the term is perhaps a little too general to describe them with sufficient accuracy and justice. There is no doubt that many of them still retain, in some degree, the distinctive points of the "old Lincolnshire ox." The constant use of pure-bred bulls upon cows with some of this blood about them has at length developed the celebrated modern animal which has for so many years been shown in great perfection at the large fairs of the county, whence they have been eagerly bought and widely distributed. The best cattle of to-day are of the rich red colour which has been prized and preserved for so many generations. They are both deep and wide of frame, have for most part down-pitched horns, and develop into great size and weight if allowed time to do so. But perhaps they are most of all remarkable for the fleshiness of carcass which the butcher is sure to find with them, a matter of more and more importance in catering for modern tastes [1]

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[1] Journal R A.S.E., Vol. for 1888, p. 519.

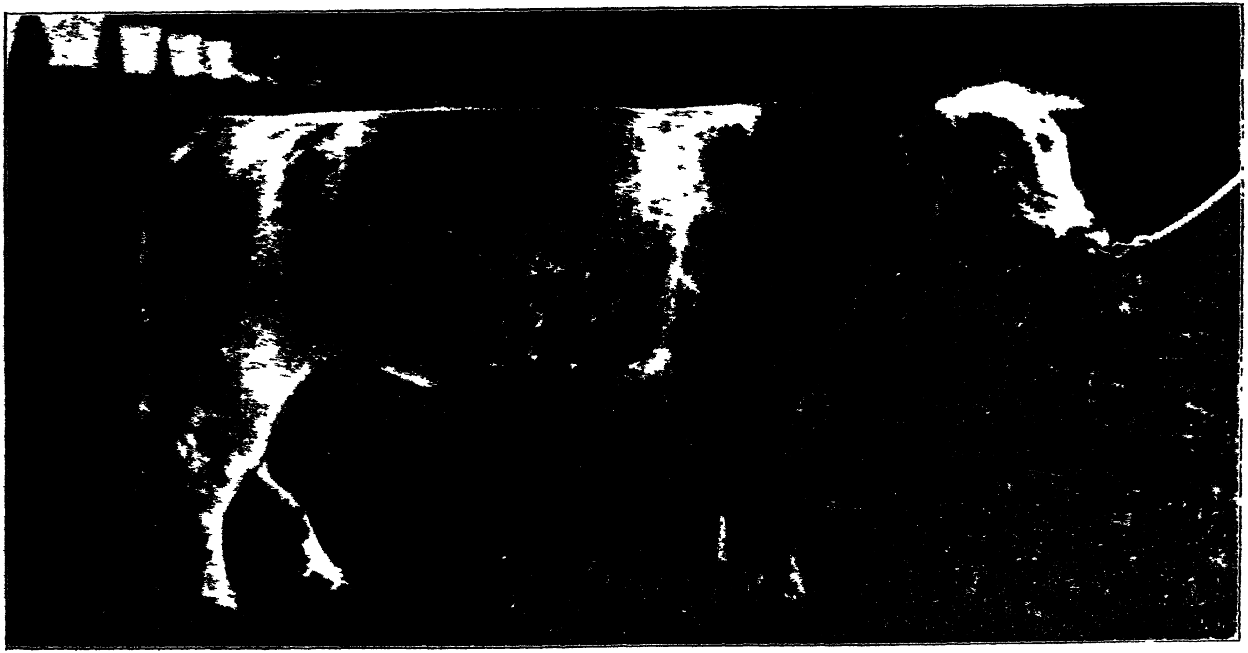

Fig. 5. Shorthorn Bull, "Royal Duke." 75509.

Winner of Champion Prize for best Shorthorn Bull, Cardiff Meeting, 1901. *Exhibited by HIS MAJESTY THE KING.*

The four classes provided 18 entries, upon which the Judges reported as follows :—

> We were generally pleased with the Red Lincoln cattle; the classes showed up in small numbers, but the exhibits were of considerable merit, grand specimens of the breed being shown.
>
> The winner of the cow class stood out prominent as a grand beef specimen coupled with a display of excellent milking properties.
>
> The bulls showed great size and substance combined with splendid feeding properties.
>
> The heifers were good specimens of this popular breed.

Herefords.— If the entries of most of the other breeds were below the average, the show of 76 Herefords in seven classes can fairly be described as the best, both in numbers and quality, since the Jubilee Show at Windsor in 1889. The Judges report that "all classes were worthy of the breed, the county, and the districts in which they were bred." The old bull class was easily headed by Mr. Edward Farr's well-known *Britisher*, which was also the male champion (see illustration on page 137). The two-year-old bulls were exceptionally numerous and good, 16 animals competing. The yearling bulls were also numerically strong (20 entries) "with a good many useful animals, but not many of imposing merit." The first and second prize bulls belonged to the same breeder, Mr. A. E. Hughes, who has won the first place in this class at the Society's Meeting for eight years out of nine in succession. The two classes for cows and heifers in-milk were both short in numbers, but the former produced the female champion, Mr. Cleasby's *Dainty* 10*th*. One of the animals in these classes was not in-milk, and could not therefore be considered by the Judges. The two-year-old heifers numbered seven, and contained the reserve for the championship. There were seventeen entries of yearling heifers, the first prize animal being of "great scale, character, and quality," and the second having "beautiful flesh, and giving every promise of becoming a good breeding cow." They were followed by other animals of "great scale and merit."

Devons.—The Devon classes numbered six, with 32 entries. They were not well filled, the largest being the aged bull class with seven exhibits, amongst them being the champion bull, Mr. J. C. Williams's *Dramatist* (see illustration on page 139). The female championship was gained by Mr. Alfred Bowerman for *Salty*, a six-year-old cow. The Judges' report was as follows :—

> The Devons at the Cardiff Meeting of 1901, although generally good, were neither numerous nor surpassing in quality. Exhibits at the Royal some fifteen or twenty years ago showed more attention to character and

Fig. 6. Hereford Bull, "Britisher." 19261.

Winner of Champion Prize for best Hereford Bull, Cardiff Meeting, 1901 *Exhibited by Mr EDWARD FARR* style than at present. Breeders have apparently in many cases made an effort to increase size and lean flesh by admixtures of blood, and may be said to have succeeded somewhat in this respect, whilst the original type and quality have given place. The "Rubies of the West," however, this year, make a fair display considering the position of the Show, the old bulls especially being quite a meritorious lot, and the young heifer class—the strongest feature of the Devons—speaks well for future productions.

Sussex.—There were 24 entries in five classes, the breed being well represented as to quality. The first prize for the old bulls (Class 88) went to "a very massive good bull, with nice skin, and very good over the heart." The yearling bulls (Class 89) were headed by "a very good young bull, low, long and deep in rib, and like to grow into a grand animal." In Class 90, for cows and heifers, in-milk, calved in 1895, 1896, 1897, or 1898, there were only two animals, both of merit. The two-year-old and yearling heifers (Classes 91 and 92) contained each four exhibits. The first prize animal in Class 91 is described as a "grand heifer with substance and quality combined;" the second in that class as a heifer of "good Sussex character with nice quality and only moderately fed." The first prize animal in Class 92 is a "very promising young heifer, of good rich colour, and well brought out."

Longhorns.—Five animals were exhibited in two classes. The Judge reports that the exhibits were capital specimens of this hardy and serviceable breed, and he found difficulty in deciding how they should be placed.

Welsh.—The Welsh Black Cattle, to which seven classes were allotted, numbered thirty-seven; but none of the classes were numerously filled. The Judges report that the animals shown were of exceptionally good quality, and that the classes as a whole made one of the best shows they ever judged. Both the Male and Female Championships were gained by Col. Henry Platt, the former with *Mallard*, No. 620 in Class 95 (see photograph on page 140), and the latter with *Queen of Spades 2nd*, an in-milk cow, No. 637 in Class 98.

Red Polled.—The total number of 28 entries in the five classes was below the average. Only three bulls were shown in Class 102, but it contained (No. 654) the Champion, Lord Amherst of Hackney's *Redvers* (see photograph on page 141). Class 103, for yearling bulls, was the best filled, with eight animals. The female classes (Nos. 104, 105, and 106) contained animals of great merit, notably those placed first in each class.

Aberdeen Angus.—Far below the average in point of numbers (33 entries in four classes), the exhibits, say the Judges, showed great general merit, both males and females being decidedly above the average. The Champion Gold Medal for the best

[Continued at p. 142.

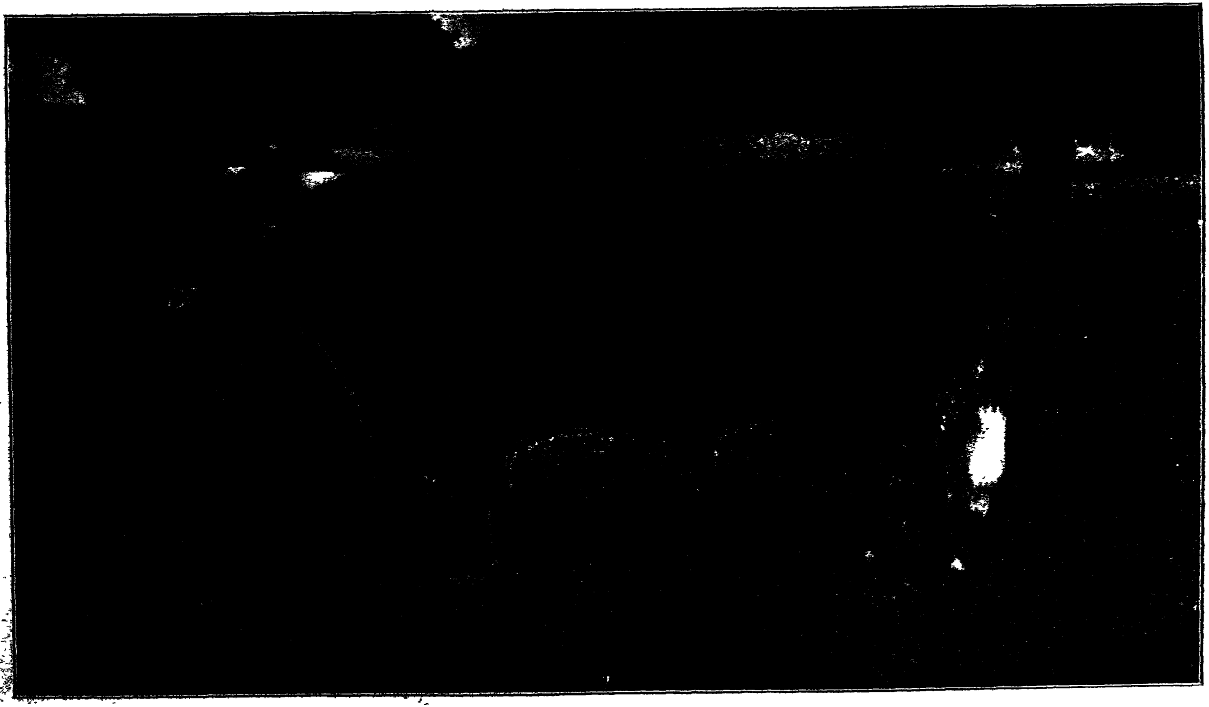

Fig. 7. Devon Bull, "Dramatist." 4015.

Winner of Champion Prize for best Devon Bull, Cardiff Meeting, 1901 *Exhibited by Mr. J. C. WILLIAMS*

FIG. 8. WELSH BULL, "MALLARD." 433.

Winner of Champion Prize for best Welsh Bull. Cardiff Meeting 1901. Exhibited by Col.

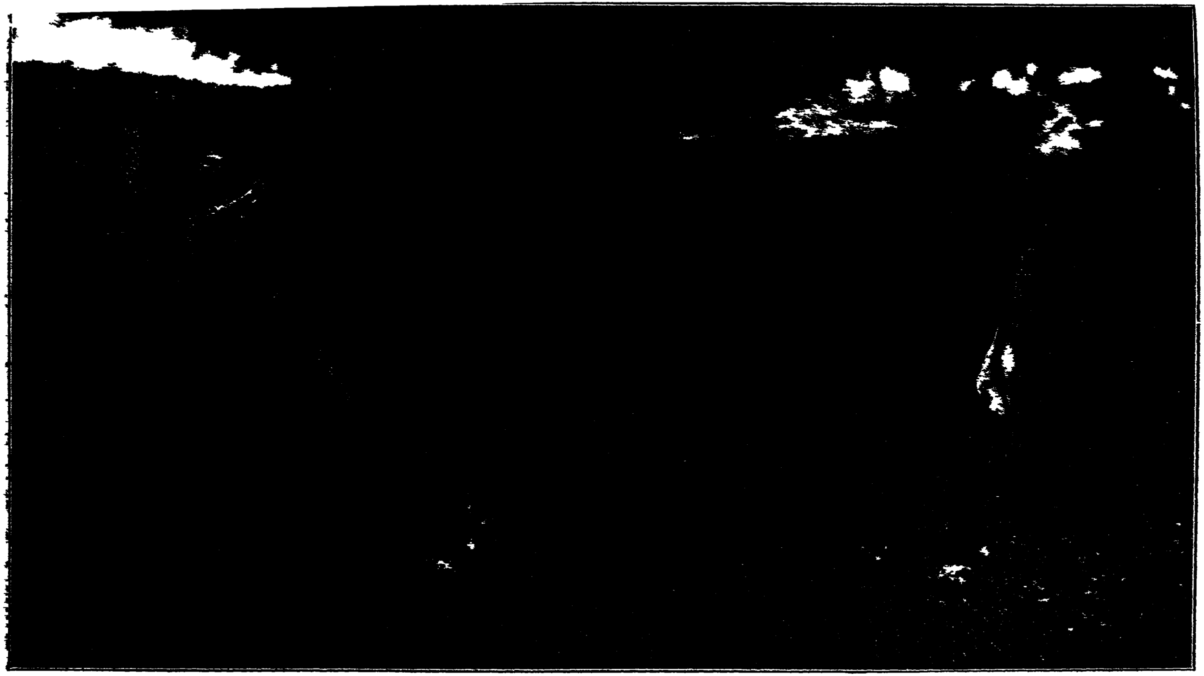

FIG. 9. RED POLLED BULL, "REDVERS." 6570.

Winner of Champion Prize for best Red Polled Bull, Cardiff Meeting, 1901 *Exhibited by LORD AMHERST OF HACKNEY* animal in the four classes went to a cow in Class 109 for cows or heifers, in-milk, calved in 1895, 1896, 1897, or 1898.

Galloways.—There were nineteen entries in the four classes, none of which were well filled. The quality of the exhibits as a whole was good.

Highland.—The two classes provided failed to attract entries from the far-distant home of this picturesque and useful breed. Only two bulls and one cow were sent by Mr. H. C. Stephens of Cholderton, Wilts.

Ayrshires.—Only five animals appeared in the two classes; but the quality of those exhibited was very high.

Jerseys.—The five classes only produced 72 entries, which is about half the average number of Jerseys at the Royal Show. In point of merit the exhibits were also below average. The Judges' report on the classes was as follows:—

CLASS 119 (old bulls).—A short class. Two very good animals first and second.

CLASS 120 (yearling bulls).—A small class, but of fair merit.

CLASS 121 (cows).—A good class throughout.

CLASS 122 (two-year-old heifers).—A fair class, but not up to the general quality of Jerseys exhibited nowadays.

CLASS 123 (yearling heifers).—A good class, but not numerous.

Guernseys.—The five classes, with a total of 35 entries, were not very well filled, and the quality of the exhibits generally was scarcely up to the average. The aged bulls (Class 124) numbered six, none of special merit. The yearling bulls (Class 125) only numbered three. The class for cows (126) was the best in the section, containing several very useful animals. That for two-year-old heifers (127) was the weakest before the Judges; but the yearling heifer class (128), with seven exhibits, contained several promising young animals.

Kerries and Dexters.—A class for yearling or two-year-old heifers, the prize money for which was found by the English Kerry and Dexter Cattle Society, was this year provided for each of these sections in addition to the two classes usually allotted to bulls and cows. The entries of Kerries numbered 18, and of Dexters 36, a considerable increase over the average number of each breed. The Judges of Kerries and Dexters report as follows:—

The Kerry bull class was excellent, the prize-winners being quite of average merit. Kerry cows were well represented, the first and second prize cows being excellent animals, and true to type, while the heifers were of great merit. The first prize heifer was full of promise and most typical, and the second and third prize animals were also excellent.

Dexter bulls were represented by an outstanding winner in the first prize animal, and the remaining animals were of satisfactory merit.

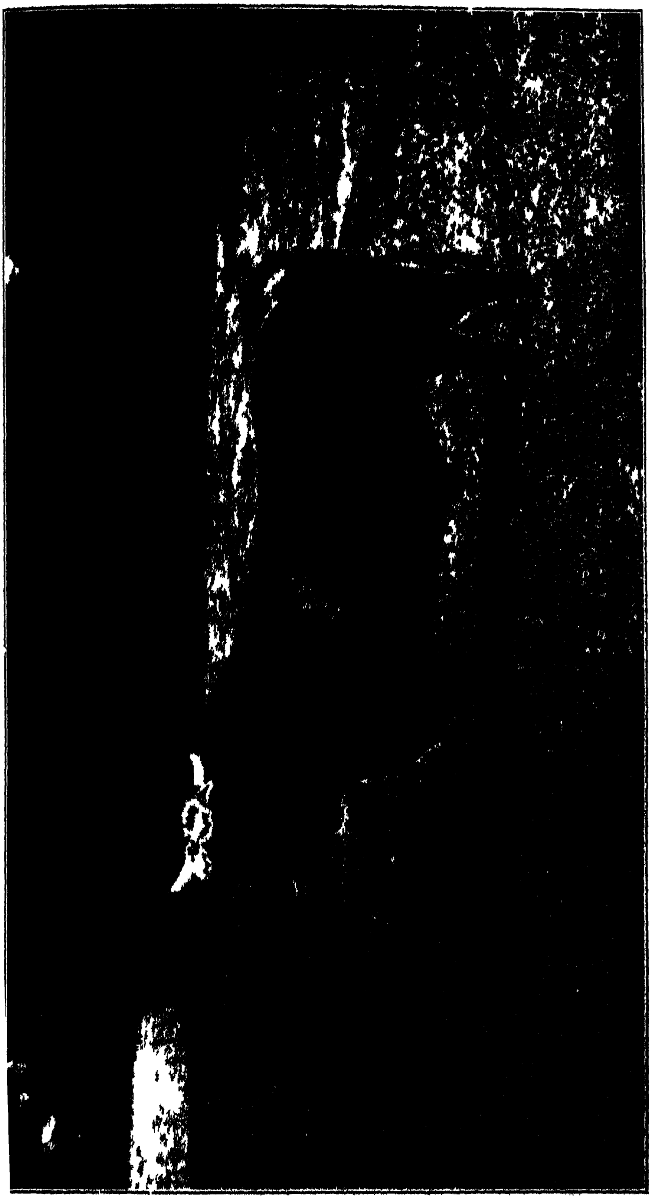

FIG. 10. DEXTER BULL, "LA MANCHA UNION JACK" 37

Winner of Champion Prize for best Dexter animal Cardiff Meeting 1901 Exhibited by Mr NORMAN C COOKSON

The cows were a magnificent class, the prize-winners all being of outstanding merit, and a like criticism may be applied to the heifers.

Both sections were excellent—a better exhibit has never been seen at the "Royal." The heifer classes, by their number and quality, quite justified their inclusion in the prize list.

We were struck by the quite apparent improvement in the uniformity of type in both Kerries and Dexters. Both Dexter cows and heifers were most gratifying.

The Championship for the best Kerry animal was awarded to Mr. Clifford J. Cory, for *La Mancha Fan*, a five-year-old cow; and the similar award for Dexters was secured by Mr. Norman C. Cookson with *La Mancha Union Jack*, a three-year-old bull, No. 870 in Class 132 (see photograph on page 143).

Dairy Cattle.—One class was provided for dairy cows in-milk of any breed or cross, judged by inspection. There were six entries, and the Judges reported favourably of the class. The first and second prize-winners were "of grand form, and were heavy milkers."

SHEEP.

The sheep numbered 519, about 100 less than the average exhibit at the Society's Show. Southdowns and Shropshires were equally represented by 76 entries. The Hampshire Downs, with 61 entries, were next in numerical display, and were followed by the Lincolns with 49 entries, and the Oxford Downs with 48 entries.

Oxford Downs.—There were 48 entries from 13 different flocks, a more than average display. All the classes were well represented and of great merit. The two-shear rams (Class 136) were very good, and the shearling rams (Class 137) wonderfully good, both as to quality and quantity. The shearling ewes (Class 139) were shown in good numbers, and were a very good level lot. The lambs, both ram and ewe (Classes 138 and 140) were strong in numbers and quality, showing early maturity, with good bone, wool, and substance.

Shropshires.—The entry of 76 pens from 16 different flocks was smaller than usual. The rams as a whole were reported as fully up to the average in quality and breed character; the ewes as a whole were most satisfactory. The class for two-shear rams (141) was not a strong one, but the prize-winners showed good breeding. The shearling ram prize-winners (Class 142) showed beautiful quality of wool and mutton, as well as correct breed type. The class for shearling rams (143) was the strongest in the section, and many first-class pens had to be content with honorary mention only. The ram lambs (Class 144) were not numerous, but those shown were quite up to the usual standard. The prize pens of shearling ewes (Class 145) were quite up to the average of former years in merit, possessing nice character, good backs, flesh, and wool, and standing square and well on their legs. The ewe lambs (Class 146) contained specimens of very considerable merit and promise, especially the first prize pen.

Entries of Sheep at the last Five Meetings, 1897–1901.

—	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897
PRIZES OFFERED	£1,330	£1,365	£1,410	£1,275	£1,275
	No. of Pens	No. of Pens	No. of Pens	No. of Pens	No. of Pens
Oxford Downs . .	48	35	31	44	27
Shropshires . . .	76	105	103	147	141
Southdowns . . .	76	79	114	84	74
Hampshire Downs .	61	64	66	59	58
Suffolks . . .	29	32	44	13	18
Somerset and Dorset Horned . .	8	6	4	6	10
Lincolns . . .	49	56	61	75	73
Leicesters . . .	20	41	30	35	60
Cotswolds . . .	26	22	21	32	21
Border Leicesters . .	22	53	24	36	61
Kentish or Romney Marsh . .	15	18	86	27	19
Wensleydales . .	13	35	12	18	21
Devon Longwoolled .	9	8	11	—	—
Dartmoor . . .	8	—	—	—	—
Exmoor . . .	4	—	—	—	—
Cheviots . . .	7	17	8	8	8
Blackfaced Mountain .	6	23	9	12	19
Lonks	—	—	—	6	7
Herdwicks . . .	8	6	2	6	15
Welsh Mountain . .	20	14	5	16	17
Ryeland . . .	11	—	—	—	—
Radnor	3	—	—	—	—
Total Entries of Sheep	519	614	631	624	649

Southdowns.—Seventy-six entries came from 13 different flocks. The championship went to the Duke of Richmond for the first prize animal in the class for two shear rams (Class 147). The shearling rams (Class 148) was a good class. The ram lambs and shearling ewes (Classes 149 and 150) were each a small class; but the first prize animals in each case were of exceptional merit. The ewe lambs (Class 151) were good throughout.

Hampshire Downs.—There was an average entry of 61 pens from 12 flocks. The Judges' report was as follows:—

CLASS 152 (two-shear rams) contains an excellent entry of eight pens. The winner is a splendid specimen of a true Hampshire, and the same may also be said of the second prize sheep, while the reserve also shows beautiful character: the whole class are very good and smart for sheep of this age.

CLASS 153 (shearling rams).—The winner is a sheep of rare type and character, and seldom, if ever, has a better shearling been shown; he not only wins easily here, but carries off also the champion prize for the best ram in Classes 152 and 153. No. 2 is very level and well fleshed, while No. 3 is quite on the right lines.

CLASS 154 (pens of three ram lambs).—Eleven exhibits: though not so numerous or so strong a class as one usually sees at the "Royal," it contains several very good pens, as is shown by the number of lots noticed.

CLASS 155 (pens of three shearling ewes).—Seven exhibits. This was a good class, containing several very typical pens, notably the three prize-winners, the highly commended and commended lots, while Mr. James Flower's first prize winners were one of the best pens ever exhibited.

CLASS 156 (pens of three ewe lambs).—A good class, six pens being noticed besides the two prizes. The first and second prize pens were beautiful specimens, and this too may be also said of the reserve; the first prize lot are really a wonderful pen of lambs, and to these was awarded the female championship.

Suffolks.—There were 29 pens from six flocks. The ram classes were of very good merit, and contained excellent specimens of the breed, uniform in type and character. The champion and reserve champion went to the same breeder, Mr. Herbert E. Smith, the former for a two-shear, and the latter for a shearling ram. The shearling ewes shown by Lord Ellesmere were of good quality and well matched, winning first and second prizes. The prize ewe lambs were excellent both in type and in the quality of their wools.

Somerset and Dorset Horned.—Three exhibitors sent eight entries. The first prize ram, "a long, level sheep with a good head" was an easy first. The ewes as a class were good, the two prize pens running each other close.

Lincolns.—Forty-nine pens represented nine flocks. The first prize winner amongst the two-shear rams (Class 164), Mr. J. E. Casswell's *Laughton Ringleader*, stood well out by himself, and gained the championship for the best Lincoln ram. The shearling rams (Class 165) were a very level lot, the first prize being a model of a true Lincoln, and was awarded the reserve number for the championship. The six pens of five shearling rams (Class 166) was "one of the best classes ever turned out at a Royal show." The remaining classes were not so well filled, but were very even in merit.

Leicesters.—Twenty pens entered from three flocks, all being present. The first prize shearling ram (Class 170) was a very well grown level sheep; the next placed animal made a good second; the third prize shearling possessed great size and substance, and was of a very useful sort. There were but three entries in each of the lamb classes (171 and 173), but their quality was quite up to the standard. The first prize ewes (Class 172) were big upstanding sheep with good flesh and capital skins; the second prize pens showed a little more of the old type of Leicester, were not quite so large, but were very typical in character. All the pens in this class received prizes or commendatory awards.

Cotswolds.—Cotswolds were strongly represented by 26 entries from four flocks. They comprised several excellent exhibits, notably the first prize shearling ram (Class 174), and the first prize pen of ewe lambs (Class 177), the latter an exceedingly handsome lot.

Border Leicesters.—Although not so numerous as when shown nearer their home, the 22 pens of Border Leicesters, which came from five flocks, were, on the whole, a creditable representation of the breed. The shearlings, especially the ewes, were quite up to the "Royal" standard. The lamb classes rather showed the effects of the unfavourable spring.

Kentish or Romney Marsh.—There were 15 pens from five flocks. The exhibits were well up to the standard, and the improvement both in quality and wool was satisfactorily maintained. The shearling ewes (Class 183) were particularly good, and the whole class was deservedly commended.

Wensleydales.—There were 13 pens from five flocks. The Judges consider that this breed of sheep has made considerable progress in quality since 1897. They add that the first and second prize rams (Class 184) were of very high quality, with the blue heads and skins typical of the really pure Wensleydale breed. The ewes (Class 185), especially those placed, showed plenty of quality, with the bone and stamina essential for reproducing the necessary qualifications of their particular breed.

Devon Longwools.—There were nine pens from two flocks. The exhibits were of high merit; the rams (Class 186) were good in fleece and flesh, and the lambs (Class 187) all well grown. Although there were but two pens of ewes (Class 188) both were of high merit, and received the first and second prizes respectively.

Dartmoors.—There were four entries in each class, two flocks being represented. The first prize animals were very good types of the breed.

Exmoor.—There were but two entries in each class sent by the exhibitor. The animals were exceptionally good specimens of the breed.

Cheviots.—Seven pens represented two flocks. The exhibits, though few in number, were thoroughly good specimens of the breed.

Blackfaced Mountain.—Six pens represented two flocks. The first and second prize rams were very good, and were "fit to win in far stronger competition." The ewes were not so good as the rams, but had sufficient merit to entitle them to the prizes offered.

Herdwicks.—The Herdwicks numbered eight pens from three flocks. The quality of the rams (Class 197) was fair, and there was little to choose between the first three exhibits. The first and second prize ewes (Class 198) were very good; the third prize pen were strong in bone but backward in condition.

Welsh Mountain.—An extra class for three-shear rams was provided in this section by the Cardiff Local Committee. The three classes produced 20 entries from seven flocks. The Judges report that the section was good, and quite equal to any previous year. The six three-shear rams (Class 199) were excellent specimens, and the first prize animal, a "thick square sheep with a fine even coat," possessed exceptional merit.

The two-shear rams (Class 200) were headed by "a grand sheep, far the best in its class." Of the ewes (Class 201) the first, second, and reserve pens were exceptionally good. The highly commended pen were also good sheep, and well matched, but were not shown in the pink of condition, as were their rivals.

Ryelands.—The classes for this old breed of sheep were furnished by the Local Committee, and attracted 11 entries from four flocks. The rams (Class 202) had amongst them three sheep of more than average merit, and the class was fully up to the usual standard. The first prize sheep was more likely to make a sire than the second, being more masculine in character. The prize pens of ewes (Class 203) were considered by the Judges to be well worthy of their position, whilst the two following pens were good representatives of the breed.

Radnors.—Two exhibitors sent three pens, which possessed no exceptional merit.

PIGS.

Pigs were excluded from the Showyard at York last year in consequence of the existence of swine fever. Happily, this year, Cardiff was not in an infected area, and the Show of Pigs was therefore resumed. The entries numbered 148, one more than at Maidstone in 1899.

Large White.—The pens of Large White pigs numbered 34. The boars (Class 205) produced the winner of the champion, described as an all-round boar of a good type. The pens of boar pigs (Class 206) were well filled, but the quality of some of the entries left much to be desired. The sows (Class 207) were a very good class, including several animals of fine type and quality. The sow pigs (Class 208) were only moderate.

Entries of Pigs at the last Five Meetings, 1897–1901.

—	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897
PRIZES OFFERED	£396	£396	£360	£389	£462
	No.	No.	No.	No.	No.
White	68	—	77	101	86
Berkshire . . .	51	—	49	53	59
Black	7	—	—	—	10
Tamworth . . .	22	—	21	44	30
Total Entries of Pigs .	148	—	147	198	185

Middle White.—The entries numbered 22, and the champion award went to an animal in the class for breeding sows (Class 211), which was a remarkably good one.

Small White.—There were 12 entries; but the classes were small. The championship was secured by a very good specimen in the class for breeding sows (Class 215).

Berkshires.—Berkshires were represented by 51 pens. The old boars (Class 217) were good, with 10 exhibits, and comprised the winner of the champion. The breeding sows (Class 219) were a really good and strong class, 11 animals being noticed. The Class (220) of pens of sow pigs was a fairly strong one of average quality.

Tamworths.—This breed was fairly well represented with 22 entries, and the classes contained some very good and typical specimens. The champion sow (Class 223) is "a grand young animal showing wonderful quality."

Large Black.—Two classes for Large Black pigs attracted only seven entries. The Judges report that the quality of the exhibits was far below what it should have been, there being not a single specimen of special merit. They add:—

> With a society of the magnitude of the Large Black Pig Breeders' Association, it is remarkable that so few should make the effort to show the public some of the best specimens of a breed which is making great headway as a practical food-forming animal.

POULTRY, INCLUDING DUCKS, GEESE, AND TURKEYS.

The entries in the Poultry Section this year made an aggregate total of 701, a distinct improvement over the last two years, although still considerably less than the totals of the years preceding 1899. The improvement is more marked than at first sight appears, owing to the fact that this year the classes hitherto provided for Table Poultry were discontinued. It will be seen from the following statement that the increase is entirely amongst the Fowls. Ducks are stationary, while Geese and Turkeys are fewer than last year:—

Entries of Poultry at the last Five Meetings, 1897–1901.

—	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingh'm, 1898	Manchester, 1897
PRIZES OFFERED	£252	£274	£268 10*s*.	£257	£257 10*s*.
	No.	No.	No	No.	No.
Fowls	609	499	552	758	691
Ducks	57	57	56	84	84
Geese and Turkeys	35	42	27	55	42
Table Poultry	—	31	34	67	50
Total Entries of Poultry	701	629	669	964	867

Fowls were divided into the following varieties, against each of which is placed the number of entries:—

Game	95	Plymouth Rock	44	Leghorn	46
Dorking	72	Wyandotte	102	Andalusian	10
Brahma and Cochin	33	Orpington	77	Hamburgh	18
Langshan	16	French	21	Any other recognised breed	29
		Minorca	46		

Poultry.—The *Game* classes, Old English and Indian, were good. *Dorkings* were also well represented, and a very grand lot of birds were on view. The Judge expresses disappointment at the absence of the old Cuckoo Dorking, a "most useful and profitable bird to keep." *Brahmas and Cochins* were fairly represented, and the quality of the *Langshans* was good, though the number of exhibits was small. The cocks and hens of the *Plymouth Rock* breed were good classes. *Wyandottes* were the most numerously represented in the Poultry section; they included a specimen of the Silver Partridge or pencilled variety recently produced by American breeders, and exhibited in England this year for the first time. *Orpingtons* showed a distinct advance in quality. The *French* breeds were this year confined to one class, which consisted of the *Houdans* and *Crève Cœur* varieties only. *Faverolles* were entered but not sent. *Minorcas* made a grand show, and the *Leghorns* showed good quality all round. *Andalusians* were poorly patronised, and contained nothing very striking. *Hamburghs* were very typical, and in splendid condition, consequently their "beautiful markings and lustrous sheen could not fail to gain attention" The classes for *any other recognised breed* (except Bantams) contained Ancona, Aseel, Modern Game, Malay, Polish, Silkie, and Spanish varieties—the Spanish, of which there were some excellent specimens, predominating.

Ducks and Geese.—The entries of Ducks consisted of 19 Aylesburys, 17 Rouen, 8 Pekin, and 4 Cayuga. In the two classes for "any Breeds except Aylesburys," eight of the nine birds were of either the Rouen or Pekin variety, the remaining bird being a Cayuga. Geese were 19 in number, 15 of the Emden and 4 of the Toulouse varieties.

Turkeys.—Turkeys numbered 16, viz. 9 cocks and 7 hens. Many of the specimens were of exceptional merit.

FARM AND DAIRY PRODUCE.

The total entries fall below those of every Meeting for the past five years, as the following Table shows:—

Entries of Produce at the last Five Meetings, 1897–1901.

—	Cardiff, 1901	York, 1900	Maidstone, 1899	Birmingham, 1898	Manchester, 1897
PRIZES OFFERED	£248	£293	£539	£252	£406
	No.	No.	No.	No.	No.
Butter	154	168	121	225	187
Cheese	77	84	74	120	195
Cider and Perry	118	107	104	112	89
Hops	—	—	62	—	—
Preserved Fruits and Vegetables	—	—	6	—	—
Hives and Honey	172	169	258	178	244
Total Entries of Produce	521	528	625	635	715

Butter.—The entries of Butter were again below the average, numbering only 154, as compared with 168 last year and 225 at Birmingham in 1898. The following report on the butter exhibited was presented by the Judges:—

CLASS 317 (*Butter delivered on or before May* 11, 1901).—In this Class there were four entries from Irish Co-operative Creameries, five were sent from private dairies, and one came from the Creamery of a private company. The quality was generally fair, but the method of packing was not altogether satisfactory. Several of the boxes in which the butter was packed were made of deal, and the lining paper was of inferior quality. A result very prejudicial to the butter followed. A mould of an injurious character developed on the outside of the butter which in the market would prejudice its value considerably. This mould has been investigated and reported on in the Society's Journal.[1] The prize butter was excellent. It may, however, be observed that probably its merit was enhanced by the careful way in which it was packed for keeping. The butter packed in resinous wood boxes was in almost all cases spoiled, whilst the earthenware jars preserved the butter in better condition. The revolution in the butter trade of the country since the class for "keeping butter" was originated by the Society renders a consideration of the question of the utility of this class desirable. With the enormous development of foreign dairying and improved means of transport, through which we have butter of good quality available at all seasons, the preservation of home-made butter for winter sale appears to be less necessary than formerly. In small dairies and for home use it may however be advisable to preserve summer and autumn made butter for home use in winter, but the preserving of it for market purposes is commercially questionable.

CLASS 318 (*Boxes of* 12 *two pound rolls of butter made with not more than one per cent. of salt*).—This class appears to have been originated with the introduction of "Normandy rolls" to England. The butter put up in boxes is a very convenient method for marketing, but considerable care is necessary in packing the butter. The Normandy rolls were remarkable through their being made and packed in boxes without paper or muslin covering These rolls remained firm, and could be readily removed from the boxes when they were received here. The butter from a large area of the United Kingdom, and especially Creamery-made butter, is not of the firm character of the Normandy butter, probably through the influence of the breeds of cattle, and probably because of the quality of the herbage of the dairying districts whence these rolls are sent. Our variable climate, too, makes it imperative to protect rolls placed in boxes with butter paper or muslin. With three exceptions the butter was sent from Irish Creameries, and there was considerable merit in the exhibits.

CLASS 319 (*Fresh butter slightly salted*) and CLASS 320 (*Fresh butter slightly salted, made from milk drawn from cows other than Channel Islands or cows crossed with Channel Islands breeds*).—The entries in these classes were large, 71 and 51 respectively, and the merit in all cases was remarkably high. It is noteworthy that the prizes in these classes were in all cases awarded to "home dairies"; but when it is considered that more care, scientific method, and variety of appliance are available in associated dairies the question as to why home dairying generally produces the larger proportion of prize winning butter is interesting. The cause may probably be found in the fact that all that should contribute to excellence in butter production is at the command of the private producer, who can select his cattle, feed them as he deems best, and whose butter-maker is experienced in making butter for exhibition. At the present time the making of butter for exhibition purposes has resolved itself into a business that is confined to a limited circle; and whilst it may be stated that the general excellence of all butter now seen at shows has reached a high standard, the circle of successful exhibitors is generally found to embrace well-known names.

The remarkable excellence of the butter at the Cardiff Show is evidence of the suitability of the British soil and climate for successful butter-making, and the question of this form of dairying taking a prominent place in the agriculture of the country is deserving of consideration.

Cheese.—Nine classes were provided for different kinds of Cheese made in 1901. The entries numbered 77, which is about the average of the past three years, but considerably below the average of the three years before 1899. *Cheddar* (Class 321) of which there were 12 entries, was of good quality and true in flavour. *Cheshire* (Class 322), with nine entries, was not good, except the first and second prize lots. Many of the exhibits showed a tendency to sourness and dryness in the curd. *Stilton* (Class 323) had 10 entries, and made a very nice exhibit of clean good-flavoured, cheeses, giving promise of a good season's make. The class certainly showed signs of improvement over last year's exhibit at York. Only five entries were sent of *Wensleydale* cheese (Class 324), and the quality of the class was inferior. The Judges only awarded the first prize. *Double Gloucesters* (Class 325) were also few in number (five entries); but all were of very good quality, and the Judges felt bound to award the third prize in spite of the small entry. *Wiltshire* cheeses (Class 326) comprised seven entries, and consisted of both coloured and uncoloured cheeses. Some of the exhibits were only Cheddar curd made up as Wilts loaf, but altogether the quality was good.

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[1] Vol. for 1894, p. 567.

The local variety of *Caerphilly* cheese was divided into two classes, according to size. In Class 327, for cheeses weighing 10 lb. and over, the entries numbered nine, and were very meritorious. The first and second prize cheeses were true to type. Class 328, for cheeses of 8 lb. and over, contained 11 entries of a mixed character. It was unfortunate that both the classes of Caerphilly cheese contained exhibits with good chances of a prize that were disqualified through non-fulfilment of the regulations as to weight and size.

Class 329, for cheeses of any other British make (except cream cheese), produced eight entries, principally of the loaf Cheddar type, although exhibited under different names. Altogether the quality was very good, particularly of the first, second, and third prize lots.

CIDER AND PERRY.

The entries of Cider and Perry totalled 118, which is the largest display since the Society first offered prizes for these beverages at the Windsor Meeting of 1889. The Judge at Cardiff, who also judged the Windsor exhibits in 1889, states that, taking the class as a whole, there is a great improvement since that time. Many of the entries were then thick and cloudy; now this is quite the exception. He states, however, that exhibitors ought to be more careful in washing their receptacles, as many of the exhibits indicated that the cider and perry had been put into dirty bottles. The cider in cask was exceptionally good and well made, the contents of nearly every cask being filtered and very fine—just fit to go into draught.

HIVES AND HONEY.

This section, which was organised as usual by the British Bee-keepers' Association, was divided into 24 classes, for which the entries numbered 172. The following is the Report of the Judges:—

In view of the fact that the early date on which the "Royal" Show is held has an adverse effect upon the Honey section of the exhibition, it was very gratifying to us to notice that the bee season of 1901 was so good as to enable bee-keepers to stage, in competition, honey of excellent quality, gathered during the current season. Beautiful section-honey in comb, and extracted honey in glass jars were shown, in which the perfection of "marketable form" was displayed in preparing the product for sale; so that it may now be taken for granted that British honey receives full justice from the hands of those who produce it. The care taken to offer it to consumers scrupulously clean, fresh looking, and wholesome in appearance will be appreciated by honey consumers of the most fastidious tastes, for they can now enjoy British honey properly prepared for the breakfast table. The class for honey trophies, too—though only four exhibits were staged—looked exceedingly well, and made a very good display.

In the classes for Hives and Appliances, the five large collections shown made up a large and attractive display of bee goods of the most up-to-date construction. There was not much to choose between the 1st, 2nd, and 3rd prize collections, so good and complete were they all. It would appear that there is still a demand for non-swarming hives, but whether any one of the several useful hives shown will or will not succeed in entirely doing away with the inconvenience of swarms issuing at awkward times remains to be seen. In the hands of a capable bee-keeper the devices shown may effect the purpose intended; but it seems to be a moot point whether or not the giving of room in advance, coupled with plenty of ventilation, will not secure the end in view as it generally does when carried out by skilled hands. Everyone will no doubt welcome a hive that will stop swarming, and when that desideratum has been secured, many persons will probably take up bee-keeping who are now prevented from doing so for the reasons stated.

The class for Honey Extractors was an uncommonly good one, eleven machines being staged, and among them several of capital construction and finish. The introduction of the "free wheel" principle and "patent brakes" for suddenly stopping the centrifugal motion of the inner cage while revolving at a high speed, is to our mind a mistake. It may be useful in a bicycle, but is out of place in an extractor, for it adds considerably to the cost without anything like commensurate results over other and simpler machines. The fact of the latter type of extractor taking both the prizes offered should sufficiently mark the opinion of the judges on the point.

We were glad to see that the class for "beeswax in cakes, suitable for the retail counter trade" is being appreciated by bee-keepers, who now put up their wax in handy, clean, and attractive boxes which keep the wax cakes clean as seen through the glass lid of the boxes by customers. This onward move will enable bee-keepers to sell their wax to shopkeepers in just the desired form, and thus one branch of bee-keeping as a home industry will be encouraged and helped.

The only further item we need mention is the class for new inventions, in which Mr. Meadows showed a powerful and effective screw-press for heather honey; and Messrs. Lee and Son a neat section-case, so well and carefully made as to effectually prevent disqualification through overlacing of sections.

BUTTER-MAKING COMPETITIONS.

The series of Butter-making Competitions which commenced at the Nottingham Meeting of 1888 were discontinued after the Manchester Meeting of 1897; but at Cardiff the Local Committee offered prizes for competitions of Butter-makers amounting to 44*l*. which were accepted by the Council. The candidates were divided into four classes, viz. Class 1, open to pupils of the Glamorganshire Dairy School (14 entries); Class 2, open to pupils of the Monmouthshire Dairy School (21 entries); Class 3, open to dairymen, dairymaids, or members of a farmer's family resident in the district of the Show, viz. Gloucester, Hereford, Monmouth, Salop, Stafford, Warwick, Worcester, and South Wales (26 entries); and Class 4, open only to the prize winners in Class 1, 2, and 3, (12 competitors). The Judges presented the following report: –

CLASSES 1 and 2.—The work done by the pupils of the Glamorganshire and Monmouthshire schools was of an especially high character. It would be invidious to criticise the style of the work of the two schools where such general excellence might be noticed. The task of placing the competitors in order of merit was extremely difficult; indeed it was in many cases decided by one or one-and-a-half marks. The teachers of the schools deserve much credit for the admirable display of the skill of their pupils at the Show.

CLASS 3 —There were several competitors here who had had much experience in like competitions; it was not to be wondered at that very good work was the general condition.

CLASS 4.—The competition amongst the prize winners of the several competitions during the Show was held on the last day, and this day was one in which skill and thoughtfulness in butter-making were put to a severe test. With a temperature in the dairy nearly 80° F. and a crowd of spectators, several hundreds, packed around the open spaces of the dairy, the making of butter within was indeed a difficult task; but training, skill, and consideration on the part of the competitors achieved marvellous results in the butter made by them.

HORSE-SHOEING COMPETITIONS.

Horse-shoeing Competitions have now been held annually by the Society since the Newcastle Meeting of 1887, when they were instituted by the Council to meet a much felt want for greater skill on the part of farriers. The earlier competitions were ably supervised by the late Mr. Charles Clay. At the Nottingham Meeting of 1888, the Worshipful Company of Farriers associated themselves with the movement; and the Freedom of their Guild has since that time been annually given to the winner of the first prize in each class in all cases when the Judges have reported that sufficient ability has been displayed. Facilities for the examination of the competitors for admission by the Registration Committee of the Farriers'

Company to the "Official Register of Farriers or Shoeing Smiths," with the right of describing themselves as R.S S. (Registered Shoeing Smith) have also been provided in the Showyard annually since 1891.

The popularity of these Competitions at Cardiff is shown by the fact that there were not less than 93 candidates, viz. 39 in Class 1, for Hunters, and 54 in Class 2, for Cart Horses, the competitions being open, as usual, to shoeing smiths from all parts of the United Kingdom. In both classes the work done was exceedingly good, and the Judges state that in Class 1 the hind shoes in particular were far better made than on any previous occasion when they have judged for the Society.

As the Cardiff entry of shoeing smiths was the largest since the commencement of the Competitions, the following tabular statement of the entries from 1887 to the present year may be usefully placed on record :—

Meeting at	Year	Prizes	Class of Horse	Number of Candidates	Class of Horse	Number of Candidates	Total Number of Candidates
		£					
Newcastle	1887	48	Hunters and Roadsters	28	Agricultural and Dray	14	42
Nottingham	1888	40[1]	Hunters	48	Agricultural	45	57[2]
Windsor	1889	42	Harness	22	Draught	11	33
Plymouth	1890	42	Hunters	22	Agricultural	7	29
Doncaster	1891	32	Hunters	14	Agricultural	12	26
Warwick	1892	32	Roadsters	22	Dray	7	29
Chester	1893	32	Hunters	15	Agricultural	12	27
Cambridge	1894	32	Roadsters	13	Agricultural	13	26
Darlington	1895	32	Hunters	8	Cart	18	26
Leicester	1896	32	Hunters	32	Agricultural	19	51
Manchester	1897	32	Hunters	44	Dray	36	80
Birmingh'm.	1898	32	Hunters	38	Dray	35	73
Maidstone	1899	32	Light	24	Heavy	31	55
York	1900	32	Hunters	15	Cart	40	55
Cardiff	1901	32	Hunters	39	Cart	54	93

[1] Including 8*l.* awarded by Lincolnshire Agricultural Society to Lincolnshire prize winners.

[2] Competitors were allowed to enter in both classes. The actual number of candidates was 57.

N.B.—From 1887-1892, entries were limited to the district of the Show; from 1893-1901, they were open to the whole of the United Kingdom.

TIMBERING AND ROPE-SPLICING COMPETITIONS.

A novel and successful feature of the Cardiff Meeting was the series of Timbering and Rope-splicing Competitions for Colliers and Timbermen. The prizes, which amounted to 21*l.*

were provided by the Cardiff Local Committee, and the total number of entries was 31. The competition in Class 1, for timbering, open to colliers only, was held on Friday, June 28 (5 entries); Class 2, for Timbering, open to timbermen and colliers on Saturday, June 29 (15 entries); and Classes 3 and 4, for the best splices in flattened stranded rope, on Monday July 1 (11 entries). In the Timbering Competitions only a hatchet was allowed to be used in the making of the joints; but the work was well done, and showed great dexterity in the use of a single tool. The rope-splicing was done in each case by a "leading hand" assisted by a "gang" of three. The Competitions attracted a great deal of attention and interest from amongst the classes for whom they were intended, and the work done was inspected and criticised by large numbers of pit hands.

The public interest in the Show, as manifested by the excellent attendance of paying visitors, was exceedingly gratifying, the more so after the financially unremunerative Shows of the three previous years. Moreover, the enthusiastic welcome accorded by the inhabitants of Cardiff and the neighbourhood, as well as the success which attended the organisation of the Show generally, will ever awaken pleasurable recollections in the minds of all who assisted at the Society's first Exhibition in the Twentieth Century.

ERNEST H. GODFREY.

13 Hanover Square, W.

THE TRIALS OF PORTABLE OIL ENGINES AT CARDIFF.

IN connection with its Cardiff Meeting of 1901, the Society offered prizes for portable and locomotive oil engines as follows:—

CLASS 1.—Portable Oil Engines, Power not to exceed 15 B.H.P. First Prize 40*l.* Second Prize 20*l.*

CLASS 2.—Agricultural Locomotive Oil Engines, Power not to exceed 20 B.H.P. First Prize 40*l.* Second Prize 20*l.*

No engines were entered for trial in Class 2.

Eight entries were received in Class 1, but only six of the engines entered were submitted for trial.

The following were amongst the conditions of trial laid down by the Society:—

All the engines will be worked with the same sample of oil, which shall be one of the well-known brands (specific gravity about ·82). If considered desirable by the Judges, a further trial of the selected engines may be made with a cheaper oil.

The adaptability of each engine for threshing and other purposes on a farm will be considered, especially as regards strength, simplicity of design, durability, stability, and freedom from fouling.

After each engine has been got into place, the competitor will be allowed a preliminary run to satisfy himself that the engine is in proper working order.

The engines must all be ready to start for trial on a given date. They will then have to run three days, running ten hours per day on their declared brake load, the petroleum and lubricating oil being weighed out.

Each competitor will be allowed one attendant only in charge while the engine is running; such attendant will be under the direction of the Judges.

At the end of the above run, each engine will go just as it stands on to a full load trial, during which indicator diagrams will be taken, brake load recorded, oil used weighed, and circulating water measured. These will be followed by light and half-load trials under similar conditions.

The points to which the special attention of the Judges and Engineers will be particularly directed are:

1. Simplicity, workmanship, and durability, combined with facilities for repairs.
2. Economy in getting to work and attendance.
3. Consumption of oil and circulating water.
4. Governing power and uniformity of speed.
5. Efficiency.
6. Cost.

7. Weight compared with power.
8. Facility of transport and stability.
9. Arrangements and capacity for carrying oil and circulating water.

The trials began on Wednesday, June 19, 1901, and continued until Monday, June 24, inclusive. The Judges were Mr. J. G. Mair-Rumley and the writer.

The following particulars of the engines submitted for trial are taken from the official Catalogue :—

2108 Crossley Brothers, Ltd., Openshaw, Manchester. Oil Engine, Improved Patent, 250*l.* 15 B H.P. With exhaust-box, silencer, wrought-iron travelling wheels, and automatic lubricators.

2109 Cundall, R., & Sons, Ltd., Airedale Iron Works, Shipley, Yorks, Oil Engine, Portable, 180*l.* 12 B.H.P.

2111 Howard, J. & F., Bedford. Oil Engine, Portable, 255*l.* 12 B.H.P.

2112 Humphries, E., & Co., Ltd., Atlas Works, Pershore, Worcestershire. "Atlas" Oil Engine, Portable, 230*l.* 12 B.H.P.; single cylinder, with silencer, water and oil tanks and connections. Suitable for threshing, etc. Friction clutch, extra.

2113 Nayler & Co., Hereford. Oil Engine, Portable, 170*l.* 6 B.H.P. For farm use. Fitted with simple friction clutch.

2114 Ruston, Proctor & Co., Lincoln. Oil Engine, Portable, 290*l.* 12 B.H.P. Fitted with friction clutch: adapted for general farm purposes.

DESCRIPTION OF THE ENGINES.

The engines which competed have certain common features. In every case there is a single working cylinder, centrally mounted at the after-end of the carriage frame. The cylinder is single acting, and the piston is of the usual trunk type. The frame is made up of a pair of rolled beams, set longitudinally, and in most cases the engine has a cast-iron bed-plate resembling that of a stationary oil or gas engine, which rests on top of the longitudinal beams, and connects the crank-shaft bearings with the body of the cylinder. The four-stroke cycle of Otto or Beau-de-Rochas is used in every case. The crank shaft carries a heavy fly-wheel and in most cases a driving pulley also, which is furnished with a friction clutch to allow the engine to be started without casting the belt. The cylinder is cooled by means of a water-jacket through which water is circulated by a pump, and in most cases the circulating water is cooled by means of a current of air induced by the blast of the exhaust. Tanks for the circulating water, and for the oil to serve as fuel, are carried in the lower part of the frame.

The chief points in which differences were found lay in the means used for regulating the supply of oil, for vaporising, for igniting the charge, and for governing.

Messrs. Crossley Brothers, Ltd., Openshaw, Manchester.

A general view of this engine, to which the First Prize was awarded, is given in fig. 1. The cylinder and main bearings are in this instance separate castings bolted to the top of a pair of steel channel beams, and stiffened by means of a pair of horizontal stay rods uniting the upper side of the cylinder with the casting which contains the bearings. The chimney, exhaust silencer, and tool box are also carried on top of the longitudinal steel channels. On their under side are bolted castings carrying the rear axle and the fore carriage for the travelling wheels, which are of wrought iron. The fore carriage is attached to the frame by a hemispherical socket which allows the axle to cant when the engine is standing on uneven ground. A large water tank is carried under the channels. The oil tank, which carries enough oil for a 10-hours' run, is in the same casting as furnishes the socket of the fore carriage. The reciprocating parts are balanced by means of segmental discs fixed on the crank webs. Automatic lubricators are fixed to all

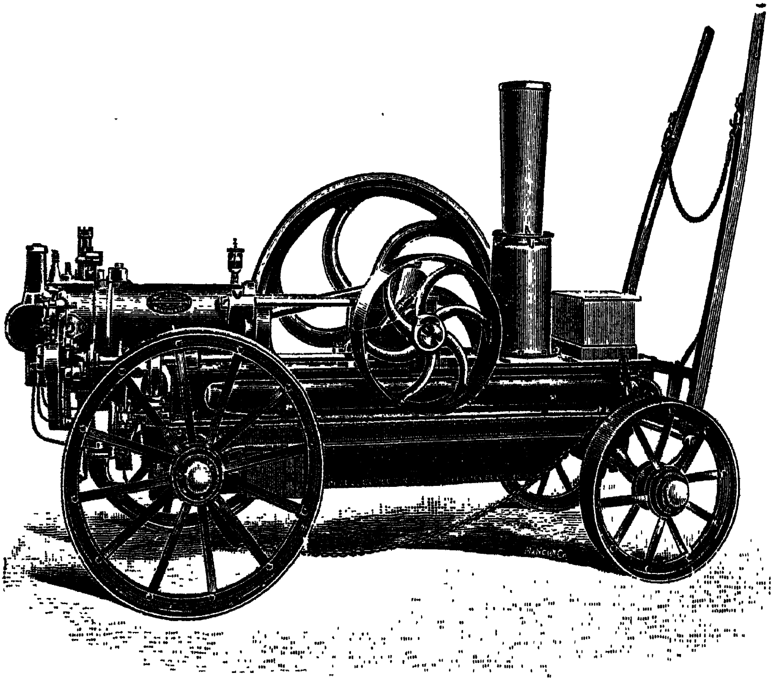
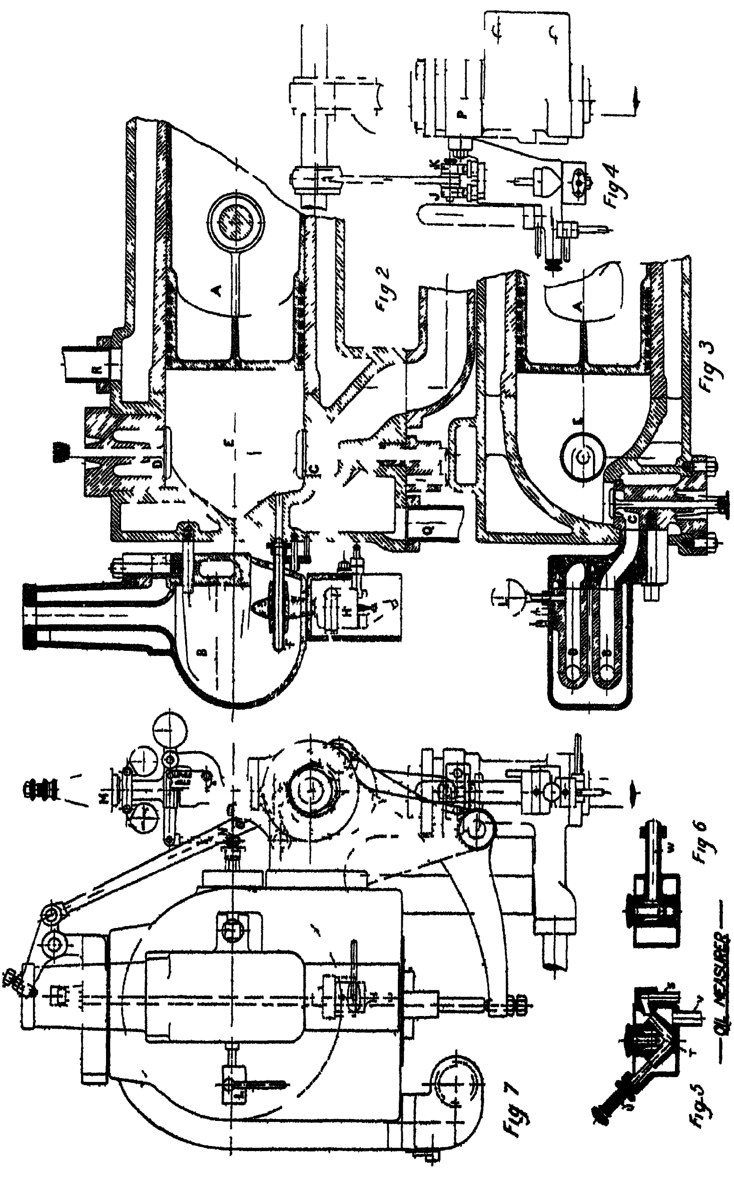


FIG. 1.—Crossley's Patent Portable Oil Engine.



Figs 2 to 7 —Crossley's Patent Portable Oil Engine working parts, and the crank pin is provided with a continuous lubricator, enabling the engine to run for long periods.

The vaporiser projects behind the cylinder, and is kept hot by an external lamp. Communication between the vaporiser and the combustion chamber is controlled by a vapour valve, which is operated by a cam and lever through a hit-and-miss arrangement connected with the governor, in such a manner that when the speed exceeds a certain limit the vapour valve is not opened. Consequently the vaporised charge does not pass into the combustion chamber, and at the same time no fresh charge of oil is sucked into the vaporiser. An auxiliary air-valve admits a charge of air at each suction stroke of the piston, whether the charge of vapour is admitted or not. This air-valve is also mechanically operated. The exhaust valve is worked by a cam and lever in the usual way. There is an ignition tube which is kept hot by the same lamp that heats the vaporiser. The quantity of oil admitted in each charge is determined by means of a "measurer," the capacity of which is adjustable by hand. Once adjusted, the measurer causes the same amount of oil to be drawn in at each charge. The measurer is fed by an oil pump, and has an overflow which returns surplus feed to the oil tank.

In the illustrations (figs. 2 and 3), A is the engine piston and E is the combustion chamber. The lamp H heats the ignition tube F, which is protected in the middle portion by a cast-iron sleeve slipped over it. The heat from the lamp passes upwards to the vaporiser B and finally to the chimney above, which serves as a regenerator to heat the incoming air which forms part of the charge.

The oil for the lamp is supplied by a pump J (fig. 4) which delivers oil through a spring-loaded valve. The spring is adjustable; there is an air-vessel on the delivery pipe and a gauge is provided to show the pressure of this supply. A separate pump K delivers oil to the measurer L, which is shown in section in fig. 5. The pump delivers at S, filling the two inclined tubes T, which constitute the measurer, and the surplus flows off by the pipe V. On the suction stroke of the engine, provided the vapour valve C is open, the oil contained in the measurer is sucked past a small non-return valve, through the branch pipe W (fig. 6), into the vaporiser B. There it meets a current of warmed air, drawn from the annular space round the chimney. When the vaporised charge is drawn into the cylinder through the vapour valve C, it meets a supplementary supply of air which enters by the mechanically operated air-valve D. The whole charge is then compressed, ignited by the tube F, and finally escapes by the exhaust valve G. The quantity of oil in the charge may be regulated by the screw plug U, which alters the capacity of the measurer. The governor M (fig. 7) controls the opening of the vapour valve by the hit-and-miss piece N, operated by the rocker O. The vaporiser consists of two tubes, which are so disposed as to give the air a considerable amount of preliminary heating before it mixes with the oil.

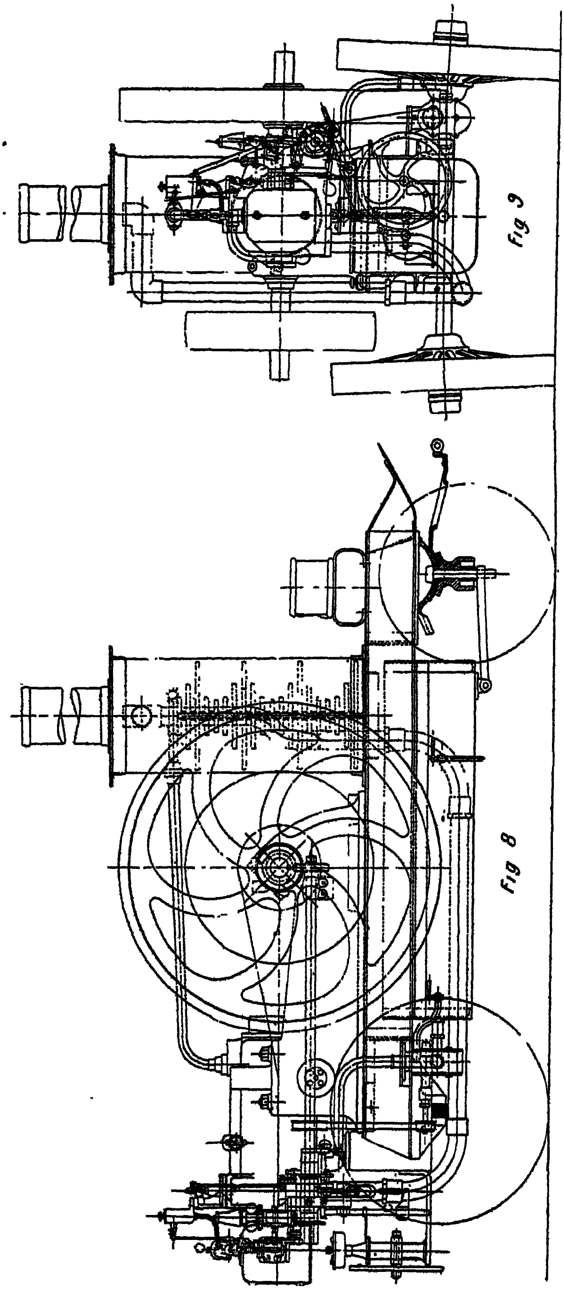
The circulating water is forced through the cylinder jacket by the pump P (fig. 4). After passing through the jacket it is sprayed over the top of the water tank and is cooled by a current of fresh air, which is drawn through the warm spray by utilising the exhaust gas to induce a blast.

To start the engine, a receiver is used containing a charge of compressed gas. Part of this charge is admitted to the cylinder by raising a small starting valve, and this gives the fly-wheel a sufficient impulse to carry it through a cycle. The receiver is charged to a pressure of about 120 lb. per square inch, and this is done at any time when the engine is running, by allowing the valve to rise when ignition takes place, during a few strokes, so that a part of the ignited charge under high pressure makes its way to the receiver.

This engine has a cylinder 10 inches in diameter with a stroke of 18 inches. It ran with the utmost regularity at about 207 revolutions per minute. Though rated as of 15 brake horse-power, and run at that load in the trials, it had a considerable margin of power, and to test this a supplementary trial was made, during which it developed 17 1 brake horse-power for three hours without difficulty, and without any sign of over-heating. The engine is of substantial design and excellent workmanship. It ran throughout the trials in the most satisfactory manner, never requiring the services of more than one attendant, and exhibited, as the results given later will show, a high degree of economy in consumption of oil.

Messrs. Ruston, Proctor & Co., Lincoln.

Messrs. Ruston & Proctor's engine, to which the Second Prize was awarded, also ran very well and showed about an equally high degree of economy in fuel. There is no lamp running continuously for heating the ignition tube: the vaporiser, after being heated by an external lamp before starting, was kept at the proper temperature by the explosions going on within it. Except when the load is reduced to zero, the method of ignition is quite satisfactory. At no load the explosions occur too seldom to keep up the temperature, and if more than a short run without load is required the external lamp has to be kept alight. The

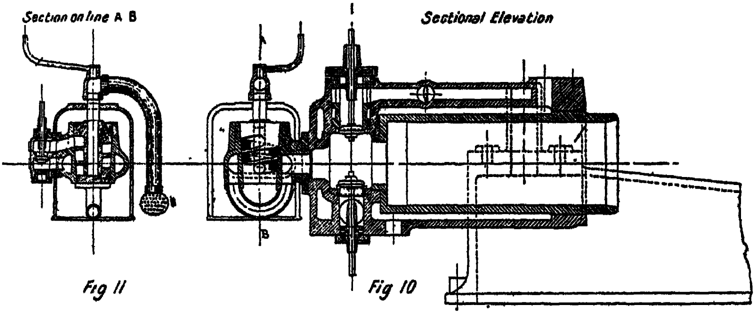


FIGS. 8 and 9.—The Ruston Patent Portable Oil Engine.

dynamical balance of the reciprocating parts, which left something to be desired in all the engines, was less perfect here, and the engine rocked considerably in running. It is unnecessary to say that Messrs. Ruston & Proctor's engine was also well built, and its design presented many admirable features.

Figs. 8 and 9 show side and end elevations of the engine, and sections of the cylinder and vaporiser are shown in figs. 10 and 11. In this, as in most cases, a bed-plate is used, bolted to the channel-iron frame. The bed-plate is comparatively high, raising the crank axle to a height which gives a very convenient clear drive to either end, but with the disadvantage that shaking due to imperfect balance is aggravated by the height of the reciprocating parts.

The oil is contained in a tank between the channel irons with sufficient capacity for a run of about 16 hours at full load, and is elevated by a pump to a measuring vessel above the cylinder. Within this vessel there is a recess kept always overflowing, the excess being drained back to the tank. From this recess the oil is measured by an annular cup in the form of a bush sliding vertically round a tube leading to the vaporiser. This bush is alternately dropped below the oil level so that it fills, and then raised over the projecting top of the central tube so that it empties its contents into the tube, from which they pass to the vaporiser.



FIGS. 10 and 11.—The Ruston Patent Portable Oil Engine.

In this way a constant volume of oil is delivered in each charge; no means are provided for varying this volume, but the engine is adapted to run with various kinds of oil by altering the volume of the compression chamber. This is done by putting in one or another of a set of blocking-out pieces provided for the purpose, which are bolted to the side of the chamber.

The oil is swept by suction into the vaporiser, together with a little air admitted through small holes in the side of the cistern, and immediately before entering the vaporiser it is joined by a larger quantity of air. This charge is then vaporised in passing round a spiral groove which constitutes the vaporiser. After vaporisation it passes on through a vapour valve to the combustion chamber, where it meets the main part of the air supply. The spiral groove which forms the vaporiser is kept hot by being surrounded by a space forming part of the combustion chamber. Ignition is effected by an automatic ignition tube placed underneath the vaporiser and opening at both ends to passages leading to the combustion chamber. The only adjustment in the hands of the attendant is that of an air-cock which throttles the main supply of air. All the valves are mechanically operated, and the governor controls a hit-and-miss arrangement which, when there is a miss, keeps the vapour valve closed and also stops the motion of the oil-measuring bush. The hit-and-miss operates through dies with four square edges, which are interchangeable.

An ingenious special device to facilitate starting consists of a roller arranged on an extension of the pin of the lever working the exhaust valve. This roller is tapped, and when screwed to one end it gears with a cam which keeps the exhaust valve open in both return strokes and prevents compression. As the engine moves the roller is revolved and automatically screws itself, after a definite number of revolutions, from the non-compression cam to a half-compression cam, and finally to the position for running with the normal condition of compression.

The cooling water is carried in a tank with a capacity of about 60 gallons, beneath the frame. A brass wheel-pump, driven by a belt from the side shaft, circulates it through the jacket and delivers it to a cooling tower which surrounds the exhaust chimney. The cooling tower is stacked with perforated boards, arranged spirally, and a current of air is drawn up, by the blast of the exhaust, past the water as it trickles down.

This engine has a cylinder 9½ inches in diameter, with a stroke of 16 inches. It ran at 220 revolutions per minute. It was rated as of 12 brake horse-power; in one of the trials as much as 12·6 brake horse-power was developed, but there did not appear to be any margin beyond this.

Messrs. R. Cundall & Sons, Ltd., Shipley.

Messrs. Cundall's engine came next to the prize-takers in economy of oil. This was a specially light engine, with a frame which seemed rather light for its work, developing about 14½ brake horse-power, with a total weight of rather less than 3 tons. Its cylinder diameter was 10 inches, stroke 18 inches, and speed about 200 revolutions per minute. A distinctive feature is an overhead water-cooler, the circulating water being sprayed over a sheet-iron canopy fixed above the engine, from which it drains to an open water-tank below the frame. A single pump delivers oil for the engine feed and for the lamps, of which there are two. One lamp heats the ignition tube, the other heats the vaporiser; the latter not being required for continuous running under heavy loads. There is no vapour valve, but a hit-and-miss control determines the opening of the valve which allows oil to pass into the vaporiser from a measuring vessel above it. The measurer is a small cup, whose rim can be raised or lowered by a screw to vary its capacity; its overflow drains back to the oil tank. An air-valve admitting air to the vaporiser opens in each suction stroke, whether oil is admitted or not. The supplementary air-valve is operated by suction only. A rotary pump circulates the cooling water.

The small simple vaporiser in Messrs. Cundall's engine is a particularly meritorious feature. The engine distinguished itself by the quickness with which it got away after the lamps were lighted. In from 5 to 6 minutes from the time the lamps were lighted the engine was running freely and ready for the brake to be applied.

Messrs. J. & F. Howard, Bedford.

Messrs. Howard's engine, with a cylinder diameter of 9½ inches and stroke of 16 inches, developed about 11½ brake horse-power.

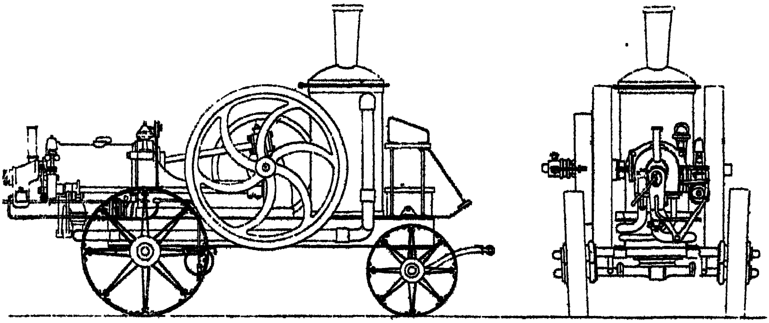


FIG. 12.—General Arrangement of the Howard Patent Portable Oil Engine.

It is a strongly built and rather heavy engine with a cast-iron bed-plate and two fly-wheels. Fig. 12 gives a general view of the engine. A neat and simple wrought-iron nipple lamp, supplied with oil at a pressure of about 30 lb. per square inch, keeps the vaporiser and igniter hot. There are two oil pumps, one for the lamp and one delivering a regulated quantity of oil direct to the vaporiser, the hit-and-miss control by the governor operating to prevent the pump from making its stroke when no charge is required. The hit-and-miss also operates a vapour valve between the vaporiser and the cylinder. There is no measuring vessel for the oil other than the pump; but the stroke of the pump is regulated by means of a screw back-stop, the pump being positively driven on the down stroke only and spring-driven on the up stroke. The main air-valve is operated by simple suction. The vaporiser, like Messrs. Crossley's, is in two parts, one for heating air before it mixes with the oil. A plunger pump circulates the water, which is cooled in a tower surrounding the exhaust chimney; the tower contains a chequer-work of boards and the water is cooled as it trickles over them by an air current induced by the blast of the exhaust. In the trials this engine occasionally showed a rather foul exhaust, and its consumption of oil was considerably greater than that of the engines already described.

Messrs. E. Humphries & Co., Ltd., Pershore.

Messrs. Humphries exhibited a 12 brake horse-power engine with several interesting features, one of which is the omission of the usual side-shaft. The governor, of the Pickering type, is driven by a belt from the main shaft. The main shaft also carries a spur-wheel gearing with another spur-wheel of twice the diameter, and a pin on the second wheel gives reciprocating motion in a direction parallel to the stroke to a long rod from which the valves are worked. There is no hit-and-miss arrangement. The governor acts by opening a relief throttle valve on the overflow of the oil-pump, so as to vary the quantity of oil admitted in the charge. The oil is injected into the cylinder in a liquid state; it is sprayed against a hot plate in the centre of which the ignition tube projects backwards. No external lamp is required, except in starting and in running under light loads. There is a positively driven air-valve and exhaust-valve, but no other valve except the oil relief.

Unfortunately this engine was found to have developed a leak between the liner and the outer cylinder, which allowed water to find its way in from the jacket, with the result that the charge often missed fire and explosions took place in the exhaust. The engine ran for the first three days of the trials and was then withdrawn from competition. The Judges consider that the results of the trials made on it, under these circumstances, though by no means so unfavourable as might have been expected, do not fairly represent the performance of the engine, and consequently no figures regarding its oil consumption are stated in this Report.

Messrs. Nayler & Co., Hereford.

Messrs. Nayler exhibited a small and remarkably simple engine, rated at 6 brake horse-power, with a cylinder 7¾ inches in diameter and a stroke of 15 inches, which developed 5·7 brake horse-power in a full-load trial. Here the governor acts through a hit-and-miss arrangement to hold the exhaust valve open during the suction stroke when the speed is too high, thereby preventing suction of the charge into the cylinder. A single suction valve above the vaporiser admits air and oil, the oil passing through a throttle tube containing a conical needle which is adjusted by a hand screw to regulate the supply. There is no oil pump, but the oil comes by gravity from a closed reservoir above the cylinder through a small open chamber in which a constant level is maintained by the device known as a chicken-feed, which determines the discharge by allowing air to enter the closed reservoir only when the level of oil in the open chamber sinks below a certain level. In this very simple feed-arrangement only one valve is mechanically operated—namely, the exhaust valve. The vaporiser and the admission tube are kept hot by an external lamp, and an auxiliary hand lamp is used to get the heat up at starting. The circulating water is cooled in an open tower or cascade placed in front of the exhaust pipe, where the water streams down over a cone of perforated metal, meeting a current of air induced by the exhaust. The exhaust was occasionally noticed to be foul.

WEIGHT AND PRICE OF THE ENGINES.

The following are particulars of the total weights of the competing engines, and their weight and price per brake horse-power rated :—

	Weight with tanks empty		B.H.P. rated	Weight per B.H.P.	Price per B.H.P.		
	tons	cwt.		tons	£	s.	d.
Crossley	4	18¾	15	0·33	16	13	4
Ruston & Proctor	4	6¾	12	0·36	24	3	4
Cundall	2	18	12	0·24	15	0	0
Howard	4	2½	12	0·34	21	5	0
Humphries[1]	4	12	12	0·38	19	3	4
Nayler	2	16	6	0·47	28	6	8

[1] Including special pipes, plating, and brake wheel used for testing purposes only.

It has already been pointed out that Messrs. Crossley's engine easily developed 17 brake horse-power, and if that figure were taken the weight would work out at 0·29 tons per brake horse-power and the price at 14*l.* 4*s.* per brake horse-power.

PARTICULARS OF THE TRIALS.

The trials began on the morning of June 19, and the engines ran for about 8 hours that day on full or nearly full loads. Load was applied in all cases by means of a simple rope-brake making a complete turn round the flywheel, carrying a dead weight on the tight side, and furnished with a spring-balance to measure the pull on the slack side. On the 20th the running was resumed under the same conditions, and continued for nearly 10 hours. On the 21st it was again resumed under the same conditions, but a stop was made after 3 hours to allow a fresh measurement of oil to be made in order that the afternoon running should form a distinct full-load trial. The full-load trial was kept up for nearly 5 hours on the afternoon of the 21st.

Up to this point the oil used had been "Royal Daylight" of specific gravity 0·80. At the end of the third day the competitors' attendants opened up their engines, and gave the Judges an opportunity of seeing the condition of the combustion chambers On the fourth day (June 22) further trials were made, using "Russolene" of specific gravity 0·824. Particulars regarding these oils are contained in the subjoined report by Mr. Charles J. Wilson:—

14 Old Queen Street, Westminster.
July 11, 1901

I have made a careful examination of the two samples of Oil received from Mr. F. S. Courtney on July 1, marked "Daylight" and "Russolene" respectively. The samples yielded the following results:

Royal Daylight.

Flash point, 86° Fahr.
Specific gravity, ·801.
Calorific value of 10,329 calories per gramme.

Russolene.

Flash point, 85° Fahr.
Specific gravity, ·8239.
Calorific value of 10,271 calories per gramme.

The calorific values given above were obtained by burning the oil in a compressed oxygen calorimeter, and subsequently applying a correction for evaporation of water produced by the combustion of the oil. This correction was calculated from a hydrogen determination made on the oil.

(Signed) CHARLES J. WILSON.

The fourth day's trials included three runs: (1) At full load for 3 hours; (2) At half load for 2½ hours; and (3) at no load for 2 hours.

The weight of oil used in each run was separately determined and included in all cases the oil used for the lamps and for starting. In the statement given below the oil per brake horse-power hour is found by dividing the total quantity of oil used in the run by the brake horse-power, and by the number of hours during which that brake horse-power was being exerted. The numbers are therefore less favourable for short runs than for long ones, under otherwise identical conditions, because of the inclusion of the oil consumed in starting and in running before the brake could be applied.

On June 24 a supplementary trial was made of the Crossley engine loaded considerably beyond its rated power.

The following Tables give a digest of the results of the several runs made by each engine, and typical indicator cards are appended. The cards were generally taken by keeping the indicator pencil in contact with the paper while ten explosions were counted. The cards reproduced here were taken in the trials with "Russolene."

TABLE I.—*Messrs. Crossley Bros.' Engine of* 15 *B.H.P.*

Date	Time of running under load	Revs. per min.	Explosions per min.	B.H.P.	Total oil used	Total water used	Oil per hour	Oil per B.H.P. hour	
	hours				lb.	lb.	lb.	lb.	
June 19	8·08	207	82	14·8	87·2	403	10·8	0·73	"Royal Daylight"
„ 20	9·63	207	83	14·65	96·7	458	10·05	0·69	
„ 21	3·62	206	81	14·4	38·7	157	10·7	0·74	
„ 21	4·75	206	80	14·5	47·5	204	10·0	0·69	
„ 22	3·00	206½	78½	14·9	33·0	137	11·0	0·74	"Russolene"
	Half-load trial:								
„ 22	2·5	210	44	7·8	19·7	—	7·9	1·01	
	No-load trial:								
„ 22	2·0	211	19·6	—	8·7	—	4·4	—	
	Supplementary trial with overload:								
„ 24	3·0	205½	87	17·1	35·0	—	11·67	0·68	

The mean consumption of oil in the four "Royal Daylight" trials was 0·71 lb. per brake horse-power hour, having regard to the duration of each trial in reckoning the mean.

In the full-power trial of June 22, with "Russolene," the indicated horse-power, determined from the mean of six cards, each showing ten explosions, taken at intervals of half-an-hour throughout the run, was 19·75. The mechanical efficiency was therefore $\frac{14\cdot9}{19\cdot7}$, or 0·76. In the trial under overload on June 24, the indicated power was 23·4, making the mechanical efficiency $\frac{17\cdot1}{23\cdot4}$, or 0·73.

The line A B in Fig. 13 shows the relation of oil consumed per hour to brake horse-power in the trials with "Russolene," and the mean result for "Royal Daylight" is marked by the point C.

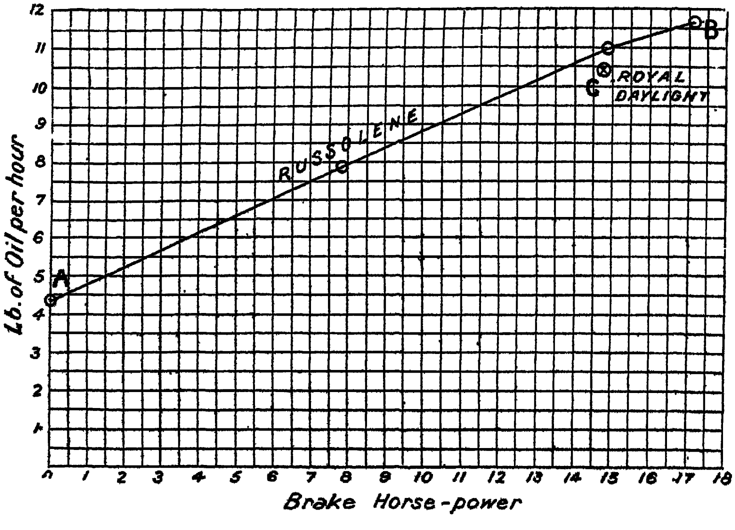


FIG. 13.—Consumption of Oil by Messrs. Crossley's Engine.

In the overload trial of June 24 it was estimated that 0·8 lb. of oil was used in starting and running before the brake was applied. If allowance were made for this, the consumption in steady running would be reduced to 0·66 lb. per brake horse-power hour. As has been said already, all the figures for oil consumption given in the Tables include the oil used in the lamp.

From the time the lamp was lighted it took the engine from 13 to 16 minutes to get away.

TABLE II.—*Messrs. Ruston, Proctor & Co.'s Engine of* 12 *B.H.P.*

Date	Time of running under load	Revs. per min	Explosions per min.	B.H.P.	Total oil used	Total water used	Oil per hour	Oil per B.H.P. hour	
	hours				lb.	lb.	lb.	lb.	
June 19	8·25	218	—	10·6	66 1	300	8·0	0·76	"Royal Daylight"
„ 20	9·70	219½	95	10·6	82·0	387	8·45	0·80	
„ 21	2·72	220	95½	10·7	20·1	94	7·4	0·69	
„ 21	4·80	220	98	10·7	38·2	190	7 9	0·74	
„ 22	3·0	219½	103	12·6	26·0	114	8·7	0 69	"Russolene"
	Half-load trial:								
„ 22	2·5	223½	65·8	6·2	15·5	—	6·2	1·01	
	No-load trial:								
„ 22	2·0	228½	34	—	10·0	—	5·0	—	

The mean consumption in the four "Royal Daylight" trials was 0·76 lb. per brake horse-power hour.

In the full-power trial of June 22 with "Russolene" the indicated horse-power was 14·9, showing a mechanical efficiency of $\frac{12 \cdot 6}{14 \cdot 9}$, or 0·85. This engine took from 10 to 16 minutes to start, from the time of lighting the lamp.

TABLE III.—*Messrs. R. Oundall & Son's Engine of* 12 *B.H.P.*

No data were obtained for this engine on June 19 as various mishaps occurred to the brake which required the engine to be eased and stopped from time to time.

The results for the other days are as follows:—

Date	Time of running under load	Revs. per min.	Explosions per min.	B.H.P.	Total oil used	Total water used	Oil per hour	Oil per B.H.P.. hour	
	hours				lb.	lb.	lb.	lb.	
June 20	9·5	200	—	14·8	117	633	12·3	0·83	"Royal Daylight"
„ 21	3·58	204	86	14·2	42·7	178	11 95	0·84	
„ 21	4·82	202	93	14·6	57	261	11 8	0·81	
„ 22	3 0	205	71	13·3	34·2	—	11 4	0·86	"Russolene"
	Half-load trial:								
„ 22	2·5	200	59½	6·5	21·7	—	8·7	1·34	
	No-load trial:								
„ 22	2·0	204	20	—	9·7	—	4·9	—	

The mean consumption at full load is 0·83 lb. per brake horse-power hour. It will be observed that the engine ran considerably above its rated horse-power. This engine took only from 5 to 6 minutes to start after the lamp was lighted.

TABLE IV.—*Messrs. J. & F. Howard's Engine of* 12 *B.H.P.*

Date	Time of running under load	Revs. per min.	Explosions per min.	B.H.P.	Total oil used	Total water used	Oil per hour	Oil per B.H.P. hour	
	hours				lb.	lb.	lb.	lb.	
June 19	7·93	202	74	11·5	118·5	339	14·95	1·30	"Royal Daylight"
„ 20	9·37	206	73	10·7	110·7	—	11·8	1·11	
„ 21	2·92	200	75	10·5	40·2	193	13·75	1·31	
„ 21	4·67	205	77	11·1	56·5	287	12·1	1 09	
„ 22	3·0	205	77½	11·4	28·5	169	9 5	0·83	"Russolene"
	Half-load trial:								
„ 22	2·5	206½	50½	7·0	20·7	—	8·3	1·19	
	No-load trial:								
„ 22	2·0	209	26½	—	7 5	—	3·75	—	

This engine took from 16 to 21 minutes to start after the lamp was lighted.

TABLE V.—*Messrs. Nayler's Engine of* 6 *B.H.P.*

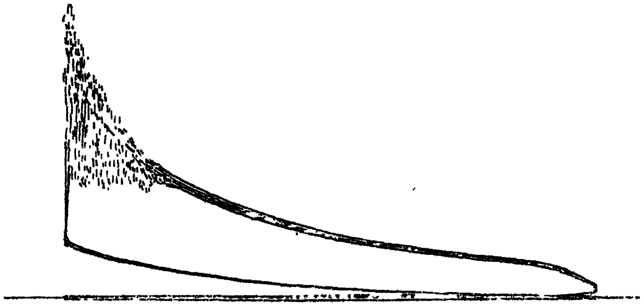
Date	Time of running under load	Revs. per min.	Explosions per min.	B.H.P.	Total oil used	Total water used	Oil per hour	Oil per B.H.P. hour	
	hours				lb.	lb.	lb.	lb.	
June 19	8·10	244	—	4·50	41·5	140	5·1	1·14	"Royal Daylight"
„ 20	9·63	240	74	4·54	46·7	446	4·85	1·07	
„ 21	2·68	241½	73½	4·57	14·5	96	5·4	1·18	
„ 21	4·8	245	78	4·62	25·5	245	5·3	1·15	
„ 22	3·0	238	84	5·71	20·2	61	6·75	1·18	"Russolene"
	Half-load trial:								
„ 22	2·5	238	67	3·08	17·2	—	6·9	2·24	
	No-load trial:								
„ 22	2·0	231	26	—	7·7	—	3 9	—	

This engine took from 12 to 18 minutes to start after the lamp was lighted.

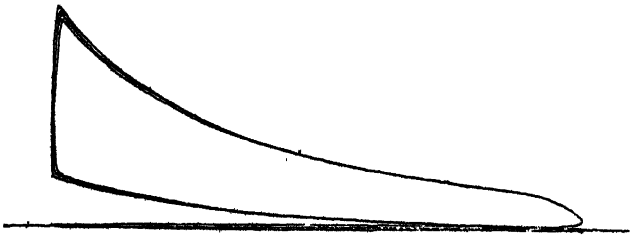
A comparison of the indicator diagrams (figs. 14 to 18) will show that Messrs. Crossley's engine was conspicuous for the regularity of its action and for the exact timing of its ignitions.

It is interesting to compare the consumption of oil found in the most favourable of these trials with the consumption in earlier trials carried out by the Society.

In the trials of Light Portable Motors at Plymouth in 1890, a Priestman oil engine developing 4½ horse-power on the brake is reported on by Professor Unwin as using 1·24 lb. of oil per brake horse-power hour. The petroleum used was Broxbourne oil, with a specific gravity of 0·81. In the Cambridge trials of Oil Engines in 1894, as reported on by Professor Capper, a Hornsby-Akroyd stationary engine by Messrs. Hornsby which gained the first prize, developing nearly 8½ brake horse-power, consumed 0·92 lb. of Russolene oil per brake horse-power hour in a three-days trial. Messrs. Crossley's engine, developing 6⅓ brake horse-power, consumed 0·90 lb. per brake horse-power hour, also in the three-days trial. The same engine running



FULL LOAD.



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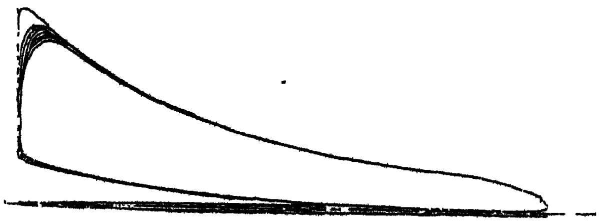
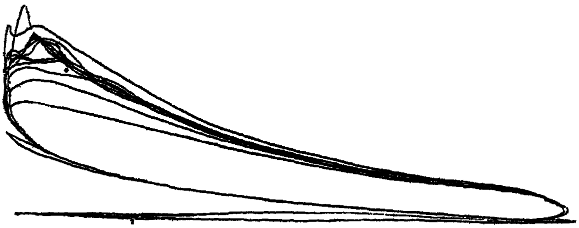


RUNNING LIGHT.

FIG. 14.—Indicator Cards of Messrs. Crossley's Engine. In each case 10 explosions. Spring $\frac{1}{120}$ in = 1 lb.

on a further trial at 7 brake horse-power, consumed 0·82 lb. per brake horse-power hour. Four portable engines were tested at Cambridge, and consumed 0·98, 0·99, 1·08, and 1·25 lb. per brake horse-power hour in their full-power trials.

The present trials show results which, so far as the best engines are concerned, are a considerable advance on those figures. But the portable oil engine remains heavy, noisy, and shaky, and there is little hope that it will lose these objectionable characteristics so long as it retains the single cylinder and the Otto Cycle.



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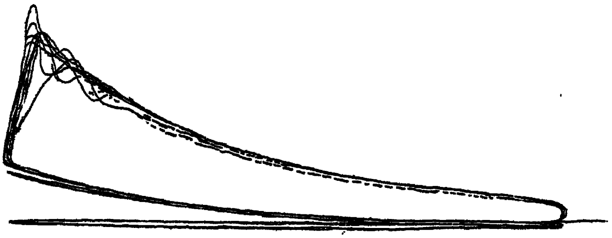

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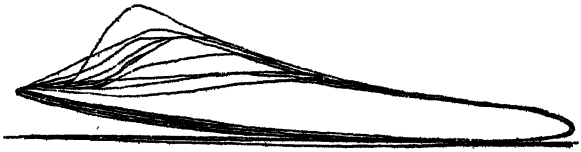
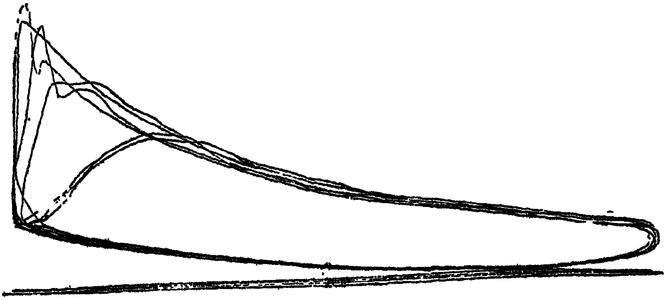
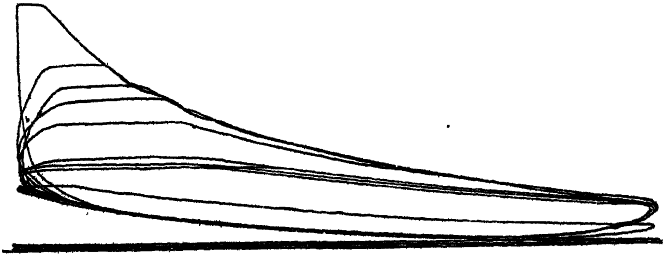


RUNNING LIGHT.

Fig. 15.—Indicator Cards of Messrs. Ruston & Proctor's Engine. In each case 10 explosions. Spring $\frac{1}{180}$ in. = 1 lb.



FULL LOAD.



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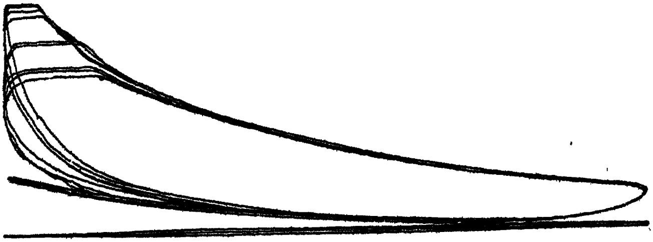
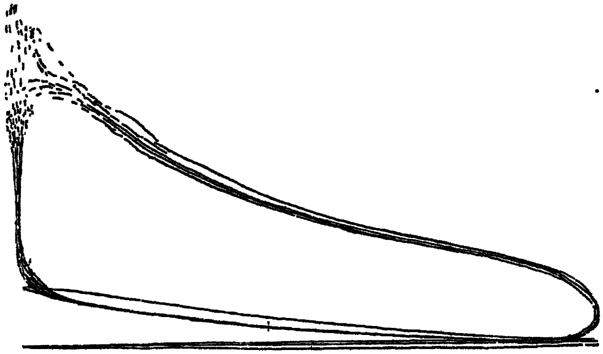
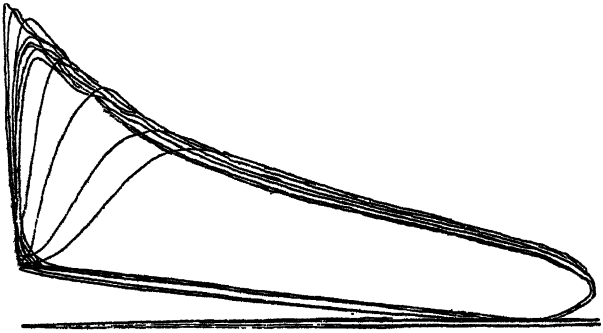


RUNNING LIGHT.

FIG. 16.—Indicator Cards of Messrs. Cundall's Engine. In each case about 10 explosions. Spring $\frac{1}{180}$ in.=1 lb.



FULL LOAD.



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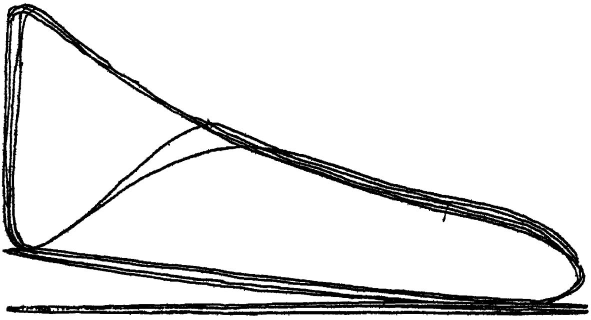
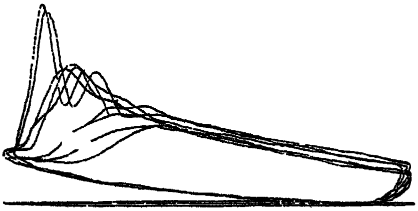


RUNNING LIGHT.

Fig 17.—Indicator Cards of Messrs. Howard's Engine. In each case about 10 explosions. Spring $\frac{1}{150}$ in.=1 lb.



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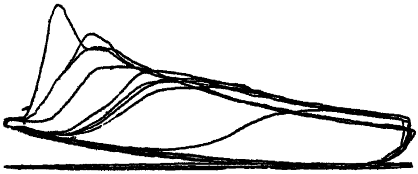

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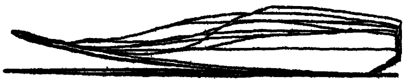

RUNNING LIGHT.

FIG. 18.—Indicator Cards of Messrs. Nayler's Engine. Spring $\frac{1}{100}$ in. = 1 lb.

The Judges are much indebted to Mr. F. S. Courtney, the Society's Consulting Engineer, for the complete arrangements made by him for carrying out the Trials.

J. A. EWING.

Cambridge.

THE TRIALS OF ICE-MAKING PLANT AT CARDIFF.

As the present is the first occasion on which the Society has undertaken trials of ice-making or refrigerating apparatus, it may be useful to preface this Report by a brief general account of the chief processes used in Mechanical Refrigeration.[1]

Any process of mechanical refrigeration may be described as a process for pumping up heat from a lower to a higher level of temperature. The refrigerating machine, of whatever type, takes in heat from the body which is to be cooled or kept cool, and rejects heat at a higher level of temperature, namely, by dispersing it into the air, or, more generally, by giving it up to circulating water. To pump up heat mechanically from a low temperature to a higher one involves the expenditure of power. Under the most ideally favourable conditions as to efficiency in working, each unit of heat extracted from the cold body requires a certain definite amount of work to be expended, an amount which is greater the greater the difference between the temperature at which heat is taken in and the higher temperature at which it is rejected. For this reason it is important, in the practice of refrigeration, to avoid making the range of temperature greater than is necessary: in other words, the body from which heat is extracted should not be kept colder than is required, and on the other hand, the water to which heat is rejected should be as cool as is available, and should be used as plentifully as the conditions of the case permit.

In practice the limiting quantity of work which is theoretically needed to raise a unit of heat from the one to the other level of temperature is always exceeded, for the actual conditions of working fall short of the ideal in respect of efficiency. But the principle holds in practice that, other things being equal, more work has to be expended the larger the range of temperature.

In an ordinary steam-engine we have the opposite process to that of a refrigerating machine. In the engine we get work done by the machine, instead of having to expend work in driving it; and we do this by taking in heat at a high level of temperature—in the boiler—and by rejecting heat at a lower level of temperature—in the condenser. The engine acts, giving out work, by the expansion of the working substance while in a state of vapour, and during this expansion the vapour falls in temperature. Heat is taken in, in the boiler, by the formation of this vapour from the liquid state; and heat is rejected in the condenser by restoration of the working substance to the state of liquid.

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[1] See also article on "Cold Storage: Its Principles, Practice, and Possibilities," in Journal R. A. S. E., Vol. for 1896, p. 601.

In an ordinary refrigerating machine these actions are reversed. We have a working substance, such as ammonia or carbonic acid, which is compressed while in the state of vapour—compressed in a cylinder by the application of mechanical power. In the compressed state it is condensed in a vessel which corresponds to the boiler of the engine. During condensation it gives out heat to the circulating water. It is then allowed to pass into another vessel which corresponds to the condenser of the engine. There it is allowed to evaporate, the pressure in that vessel being low, and in evaporating it takes in heat from the body that has to be cooled. After evaporating it is again compressed in the cylinder, again condensed, and so on. The temperature at which it condenses is determined by the temperature of the available water supply: the temperature at which it evaporates in the other vessel may be made as low as is desired, for it is determined only by the pressure at which the compressing cylinder takes in the vapour, and the cylinder may readily be arranged to pump from any pressure.

The organs of such a refrigerating machine are shown diagrammatically in fig 1. There B is the compressing cylinder or pump, which takes in vapour from the "refrigerator" or evaporator C, and delivers it compressed to the condenser or cooler A, where it condenses, giving out heat to the circulating water by which the coil of pipe in A is kept cool. The condensed liquid streams back to C through a nicely adjusted throttle-valve D. In C it is re-evaporated, taking in heat from the brine or other medium surrounding the coil of pipe in which the evaporation there takes place. In the action of the pump B vapour at an uniform low pressure is taken in from C during the whole of the up-stroke. This is compressed during the down-stroke until its pressure becomes equal to that of the condensing vapour in A, and then during the remainder of the down-stroke it is delivered at an uniform pressure to A, where it is condensed. The working substance in such machines is, as a rule, either ammonia or carbonic acid, though sulphurous acid is also used. Of these substances ammonia is most largely used for large machines on land, its chief advantages being that, with the temperatures usual in refrigeration, its vapour pressure is neither inconveniently high nor inconveniently low, and also that the efficiency of the process—as measured by the ratio of cooling effect to power expended—is higher for ammonia than for other substances. For refrigeration on board ship carbonic acid is generally preferred: its vapour pressure is much higher, and it requires rather more power to give the same refrigerating effect, but these drawbacks have to be weighed against the discomfort and danger that would attend any serious leakage of ammonia gas in the engine-room or hold of a ship. Carbonic acid allows, moreover, the compressing plant to take an exceedingly compact form.

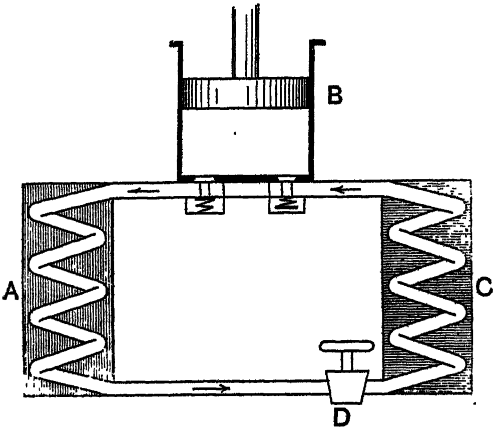

FIG. 1.—Scheme of Vapour-compression Refrigerating Machine.

When refrigerating plant of this class is applied to ice-making, the vessel C within which the evaporator coil is placed commonly takes the form of a brine tank, into which open cans containing the water to be frozen are introduced. The water in these cans is kept in a state of gentle motion during the whole process of freezing, either by mechanically rocking the cans or in some other way. This facilitates the escape of air held in solution in the water—which would otherwise become entrapped in the form of small bubbles—and thereby tends to make the ice transparent and clear. When, on the other hand, the object of the refrigeration is to keep a room cold, such as a room for cold storage, the refrigerated brine is made to circulate through pipes—distributed throughout the room, generally near the ceiling. Or, the brine may in that case be dispensed with altogether, and the evaporator coil may itself be distributed throughout the room where refrigeration is wanted. When the problem is to cool water or other liquid, the liquid to be cooled takes the place of the brine in the vessel C, and is caused to circulate through the vessel at a rate depending on the amount of cooling that is required.

This brief description of mechanical refrigeration has dealt, so far, only with the vapour-compression process, in which the working substance is a volatile material that passes alternately from the state of vapour to that of liquid, and back to the state of vapour, as the process goes on. This process is by far the most efficient method of refrigeration, in the sense of requiring the least expenditure of power. But no notice of mechanical refrigeration would be complete without at least a mention of the earlier process in which the working substance is air, a process which may still be found in operation on board ship and elsewhere. In machines for refrigerating by the agency of air there are two cylinders, one serving as a pump to compress the air, while the other is a smaller cylinder in which the air is expanded. The general scheme of such a machine is shown in fig. 2, as applied to the direct cooling of the atmosphere of a cold chamber. There M is the compression cylinder, which takes in air from the chamber, and compresses it. By this compression the air is warmed—warmed to a temperature considerably above that of the available supply of cooling water. Then the warm compressed air passes on to the vessel A, where it is cooled by means of circulating water. Its

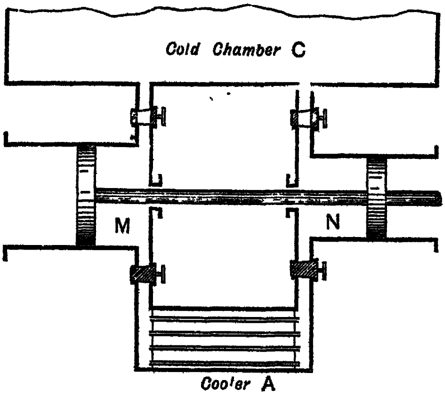

FIG. 2.—Scheme of Air Machine.

pressure, however, is still high, and accordingly it can expand in its second cylinder N, doing work against the piston there, before its pressure falls to that of the chamber from which it came. In so expanding it becomes cold—colder than it was when it came from the chamber. It is then restored to the chamber. Thus at each operation of the machine a portion of air is taken from the chamber, compressed, caused to give out heat in the compressed state to the cooling water, expanded, and thereby cooled below its original temperature. The net amount of power used is the difference between what is spent in the compression cylinder M and what is recovered in the expansion cylinder N. The action of the air machine requires more power to be expended than when the working substance is a condensible vapour, mainly because in using air the range of temperature of the whole operation is widened. For in compression the temperature of the air has to be raised much above that of the water supply, and in expansion it falls much below that of the cold chamber. Another drawback to air machines is their comparatively great bulk, in relation to the cooling effect they produce. They take, however, an important place in the history of mechanical refrigeration, for it was the development of the Bell-Coleman air machine about 1877 that created the trade of importing frozen meat.[1]

A Prize of 15*l.* was offered by the Society at the Cardiff Meeting of 1901 for a small ice-making plant, suitable for a dairy, the output not to exceed 4 cwt. in 10 hours. Mr. J. G. Mair-Rumley and the writer acted as Judges.

The only competitor was the firm of Messrs. J. & E. Hall, of Dartford, who entered a machine which was described in the official catalogue as follows:—

4070. HALL, J. & E., LTD., Dartford. Refrigerating and Ice-making Machine, using carbonic anhydride as refrigerating agent. Arranged with brine evaporator tank placed inside the cold chamber, whereby the action is continued after the machine is stopped, 125*l.* Arranged for cooling water, with iron pipe cooler, 125*l.* Arranged for ice-making, with ice tank and rocking ice moulds, 130*l.*

Messrs. Hall exhibited this machine in connection with a cold chamber, 17 feet long, 11 feet 9 inches wide, and 8 feet 9 inches high (outside measurements). The walls of the chamber were insulated against the entrance of heat by a packing of silicate cotton 8 inches thick. At one end admission to the chamber was obtained through double doors forming an air lock. Near the other end was the brine screen, through which the refrigerated brine circulated. This was a vertically placed vessel 9 feet long, 4 feet deep, and 9 inches wide, which was set a few inches away from the wall of the chamber to allow of free

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[1] For further particulars on Refrigeration, reference may be made to a course of lectures on "The Mechanical Production of Cold," delivered before the Society of Arts by the present writer in 1897, and published in the Journal of that Society, Vol. xlv. Nos. 2334–2339.

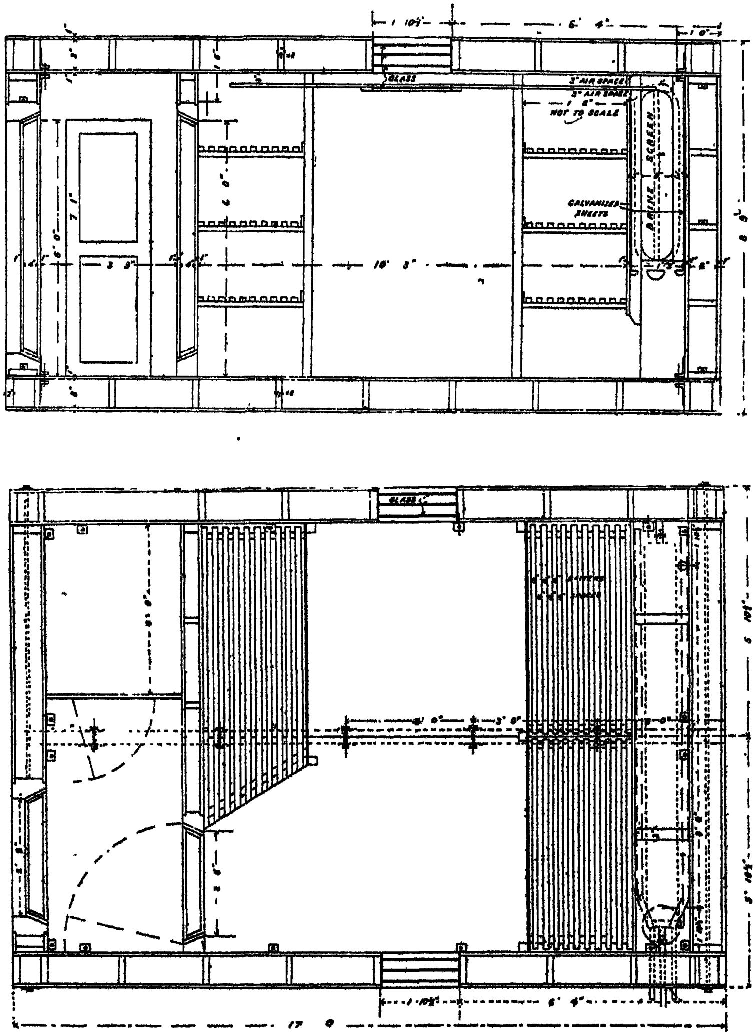

FIG. 3.—Sectional Elevation and Plan of Cold Chamber.

circulation of air. As the air, cooled by contact with the sides of the brine screen, descended, its place was taken by air drawn from the upper portion of the chamber between the ceiling and a horizontal screen hung 3 inches below it. The construction of the chamber is shown in fig. 3, and fig. 4 gives a general elevation of the apparatus, omitting the ice-making tank.

The refrigerating machine was of the vapour-compression type. It comprised a small carbonic acid compressor, with a condenser for the carbonic acid consisting of a helical coil of internal and external piping, the carbonic acid being compressed in the inner pipe while the cooling water circulated through the space between that and the outer pipe. This double helix was arranged round a cylinder, and the inside of this cylinder (with silicate cotton packing between it and the condenser coil), was utilised as a water-cooler. The water-cooler consisted of a coil of pipe in which the condensed carbonic acid was re-evaporated, and over which the water to be cooled was made to pass. To cool water was only one of three alternative uses of the machine. Another use was to extract heat from the cold chamber, and this was done by arranging the pipes so that the condensed carbonic acid was re-evaporated in a coil contained in the brine screen within the chamber.

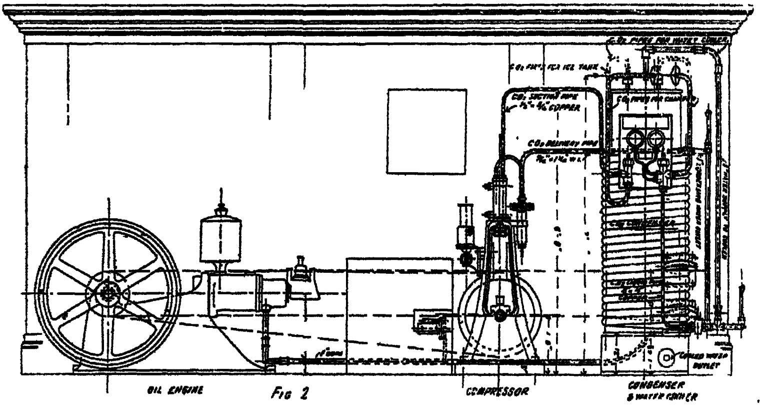

FIG. 4.—Elevation of Refrigerating Plant.

The third alternative use was to make ice. For this purpose the condensed carbonic acid was caused to re-evaporate in a coil contained within a brine ice-tank into which eight cans for ice-making were inserted. The cans, each of which contained about 30 lb. of water, were slung side by side in a swing frame to which a rocking motion was imparted by a belt from the engine driving the compressor.

This was an oil engine by Messrs. Tangye, which developed about 2½ effective horse-power in driving the apparatus.

The compressor is shown in section and side elevation in fig. 5. It has a double acting piston 1½ inches in diameter, the piston rod being ¾ inch, with a stroke of 6 inches. The packing both of the piston and of the stuffing box consists of a pair of Bramah leathers. In the cylinder cover and the covers of the valve boxes the joints are made by means of a solid copper ring, and similar copper joints are used throughout the system of pipes. The gland is of the "lantern" type, and the middle space between the two packing collars is kept charged with oil at a pressure slightly in excess of the highest pressure in the compressor. This is done by means of an apparatus which is shown in fig. 6. Oil, poured in through a strainer, is delivered by a hand pump into a cylindrical chamber Q, containing a free piston P, the back of which is in communication with the delivery side of the compressor. The area of the front of this piston being less (by the section of the rod) than the area of the back, it follows that the pressure on the oil is correspondingly greater, and hence the oil is delivered to the gland at this greater pressure. It gradually passes over, while the piston P slowly advances. From time to time the hand pump is worked, refilling the chamber Q with oil, and forcing P back to the beginning of its stroke. On the carbonic acid delivery pipe there is an oil separator which is drained from time to time to recover the oil. This draining of oil involves the loss of some of the carbonic acid with which the apparatus is charged, and the loss arising in this way, or from general leakage, is made good by drawing carbonic acid occasionally from a compressed

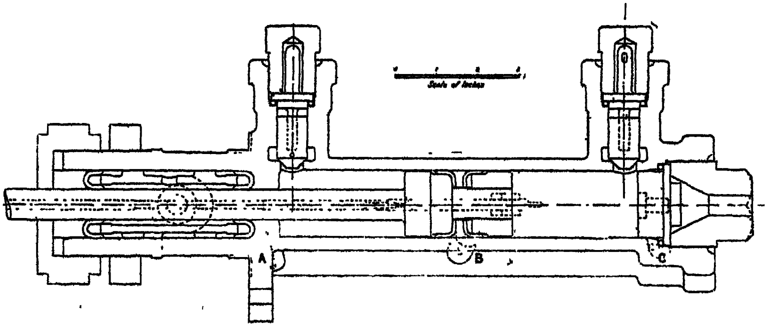

FIG. 5.—Section of Compressor.

gas bottle. The cost of the carbonic acid is about 2*d.* per lb., and 11 lb. form a complete charge. In the trials the compressor ran at 117 revolutions per minute.

It was explained to the Judges that the price 125*l.* stated in the catalogue included the brine screen, but not the refrigerating chamber. Used as a water-cooling plant, but without the brine screen, the price of the apparatus was also 125*l.* Used as an ice-making plant, with ice box, but without brine screen or water-cooling apparatus, the price was 130*l.*

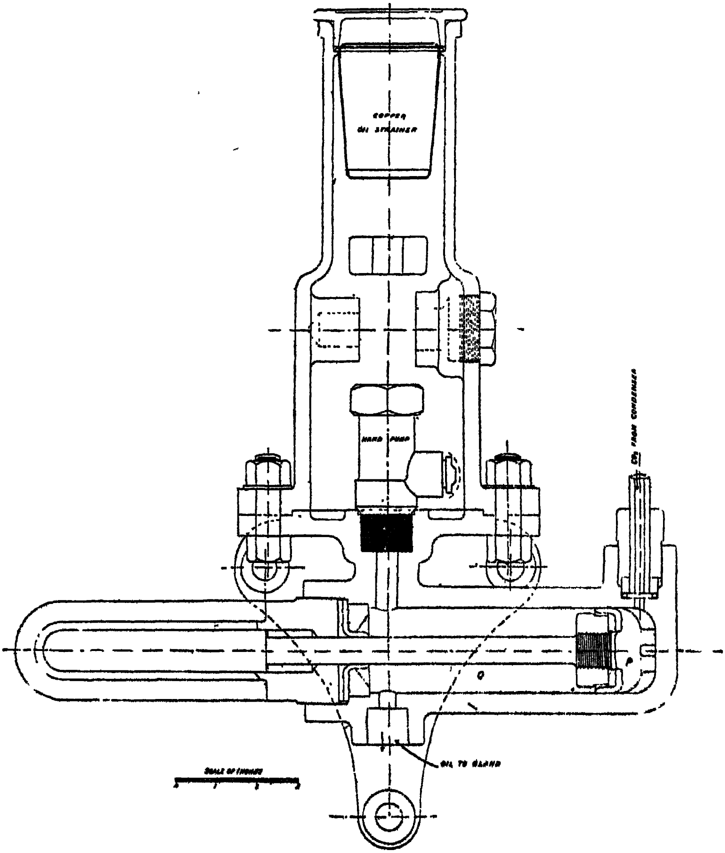

FIG. 6.—Apparatus for Lubrication of Compressor.

Owing to the uses which the cold chamber was put to during the Show, it was not practicable to make experiments on the action of the machine in cooling and keeping cold that chamber.

Tests were made of the action of the machine when applied (1) to ice-making and (2) to water-cooling.

(1) TEST OF ICE-MAKING.

In the ice-making test on June 22 the eight cans containing in all a net weight of 230¾ lb. of water were put, at a temperature of 65° F., into the brine which was already cooled to 7½° F. Five hours later the machine was stopped, the water being then frozen perfectly solid throughout. The temperature of the brine had fallen by that time to 1° F.

The power exerted by the gas engine was determined by removing the driving belt, substituting a rope-brake, and adjusting the load on the brake until the number of explosions per minute became the same that it had been during the test. In this way the engine was found to have been exerting 2·2 B.H.P. The cooling water entered the condenser at a mean temperature of 59·7° F. and left it at 65° F. The pressure of the carbonic acid on the delivery side was about 875 lb. per square inch.

In this trial, the cooling effect represented by the conversion of 230¾ lb. of water at 65° F. into ice at 1° F. is 43,980 thermal units. But in addition to this the brine was lowered from 7½° F. to 1° F. and the ice-cans were cooled from 65° F. to 1° F. These items represent an additional cooling effect equal to 7,420 thermal units, making the total 51,400 thermal units. This was done by an expenditure of 11 horse-power hours, equivalent to 28,000 thermal units, a result which must be considered highly satisfactory in so small a machine, in view of the wide range of temperature through which the heat had to be raised from the temperature at which it was taken in to the temperature at which it was rejected.

To those who are not familiar with the action of refrigerating machines it may appear paradoxical that the refrigerating effect expressed in thermal units is greater than the number of thermal units which represents the equivalent of the work spent in driving the machine. A little consideration, however, will show that there is no real paradox. The refrigerating effect is the number of heat units pumped out of the body which is being refrigerated, and brought up from that low level of temperature to the higher level of the condenser, where it is discharged. To pump this heat up requires an expenditure of work which bears no simple relation to the amount of heat so pumped. If the machine is efficient, and if the heat is being pumped up through only a small interval of temperature, the quantity pumped may be many times greater than the thermal equivalent of the work done in pumping it. In the present instance, the range of temperature is large, and the quantity of heat extracted from the cold body is not quite double the equivalent of the work spent. The ratio of heat extracted to work done is sometimes called the coefficient of performance.

(2) TESTS OF WATER-COOLING.

Tests of the action of the apparatus in cooling water were made on June 24. In the first the water was cooled through 6·52° F., from 59·45° F. to 52·93° F. The quantity of water cooled and the quantity of cooling water were measured by periodic discharges into a tank with a volume of 25 gallons. The mean time taken to fill this tank by the cooled water was 2·98 minutes, which corresponds to 84 lb. per minute. The cooling water was heated from 59·45° F. to 69·8° F., and the amount of it was 55 lb. per minute. Hence the refrigerating effect was 548 thermal units per minute, and the heat rejected to the condenser was 569 thermal units per minute. The engine working the apparatus developed about 2·2 effective horse-power, the equivalent of 93 thermal units per minute. In this instance, therefore, the coefficient of performance was nearly 6, a much higher figure than in the ice-making trials, in consequence of the small range of temperature through which the heat is here raised.

In a second trial the water was cooled through a longer range, namely, from 59·6° F. to 42·5° F., or through 17·1°. It took on the average 10·38 minutes to deliver 250 lb., making the quantity cooled 24·1 lb. per minute. Thus the refrigerating effect was 412 thermal units per minute, which was done with about the same expenditure of work as before. The amount of cooling water was 69 lb. per minute, and this was heated through 6·8°, showing that the heat rejected to the condenser was 469 thermal units per minute.

It is to be regretted that no other refrigerating plants were entered for trial. The Judges were, however, very favourably impressed by Messrs. Hall's compact and effective apparatus, which appeared to be well adapted to the purpose in view, and they had no hesitation in awarding it the prize.

J. A. EWING.

Cambridge.

MISCELLANEOUS IMPLEMENTS EXHIBITED AT CARDIFF.

IN point of numbers and in excellence of design, finish and workmanship, the exhibition of Implements at Cardiff showed little falling off from the high standard to which the Implement Department of the Royal Show has attained, the total number of exhibits of implements being 4,070, as against 4,933 at York and 4,321 at Maidstone. The entries for the Society's Silver Medals for New Implements for agricultural or estate purposes numbered 39, against 80 at York and 49 at Maidstone.

It was impossible that the spectators' admiration should fail to be aroused at the sterling work and beautiful finish of many of the exhibits of the leading manufacturers; yet it is disappointing to have to say that the novelties were few and unimportant.

Perhaps the most striking feature of the exhibition was the number and excellence of the oil engines that were attracted by the prizes offered by the Society.[1] In simplicity of construction, ease of manipulation, and economy of working, these machines have made great strides towards perfection, and appear to be running the rival steam engine a close race for supremacy; so that one could not help wishing that it had been possible to chronicle some attempt towards the development of this form of motor power for agricultural purposes in the field. There appear to be many agricultural operations to which a light yet powerful motor, obtainable at a reasonable cost, may be applied, with the advantage of greater economy and rapidity over horse power. It is to be hoped that at no distant date some of our enterprising manufacturers will provide a practical solution of the problem.

My colleague, Mr. J. W. Kimber, and myself, with the assistance of the Society's Consulting Engineer, examined carefully all the thirty-nine exhibits entered as New Implements. We also paid a visit to every stand in the Implement Department.

It was with much regret that we found ourselves unable to equivalent of the work done in pumping it. In the present instance, the range of temperature is large, and the quantity of heat extracted from the cold body is not quite double the equivalent of the work spent. The ratio of heat extracted to work done is sometimes called the coefficient of performance.

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[1] See Report on the Trials of Oil Engines, page 158 *et seq.*

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My colleague, Mr. J. W. Kimber, and myself, with the assistance of the Society's Consulting Engineer, examined carefully all the thirty-nine exhibits entered as New Implements. We also paid a visit to every stand in the Implement Department.

It was with much regret that we found ourselves unable to recommend the award of a silver medal. Probably at no period in the history of agriculture are labour-saving appliances more necessary or in greater demand; but at the same time it must be borne in mind that farmers have little money to invest in new implements which may be of doubtful utility, and, having given a practical field trial to four of the most promising articles, my colleague and myself reluctantly arrived at the conclusion that we were not justified in selecting any of the entries for that distinction which attaches to the Silver Medal of the Royal Agricultural Society. It also appeared to us that this distinction should be carefully guarded, both in the interests of implement makers and of intending purchasers.

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[1] See Report on the Trials of Oil Engines, page 158 *et seq.*

Notwithstanding the absence of any article which we were able to consider as being worthy of the award of a silver medal, there were several appliances useful to agriculture which have not been described before, and which are of sufficient interest to notice in this report. I propose to briefly mention them in their catalogue order.

Article 549.—*Messrs. F. C. Southwell & Co.*, 75 Southwark Street, London, S.E. "Ohio Hay-loader." Manufactured in America. Price 21*l*.—This implement is designed to pick up hay from the ground, either in swath or windrow, and deposit it upon the waggon or cart (fig. 1). It is attached by an iron rod to the rear axle of the vehicle to be loaded, and consists of an inclined platform, slightly wider at the lower than at the higher end. It is carried on iron road wheels, from the axle of which chain gearing operates a set of slotted reciprocating splines, to the underside of which light steel forks are attached. Spring tine rakes are fixed to the ends of the splines nearest the ground, and these pick up the hay, which travels up the platform between the underside of the reciprocating splines and the platform, with a jerking motion, until it is deposited upon the cart, when a man builds up the load in the ordinary way. There is no doubt that an efficient implement of this description would be appreciated, as saving the labour of "pitchers" and as effecting greater rapidity in the loading of a crop. It was deemed worthy of a trial, and was

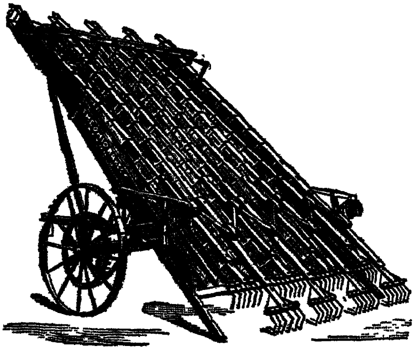
FIG. 1.—The "Ohio" Hay-loader.

set to work, attached to a waggon, upon a crop of meadow hay estimated at about 25 cwt. to the acre. The weather conditions were favourable. The crop was picked up from the ground well and clean, but it showed a tendency to "bunch" at the top of the platform, and the delivery was somewhat irregular, making it rather difficult for the loader to get it solid enough upon the load. The draught also appeared excessive for two horses. The exhibitor attributed the imperfections to want of adjustment, and it is a pity that attention had not been given to this matter before it was placed before us.

Article 702.—*Messrs. P. J. Parmiter & Co.*, Station Works, Tisbury, Wilts. "Patent Turnip-singler." Price 12*l.* 10*s.*—This implement consists of a number of flat hoes, mounted on a disc set on an inclined spindle attached to a two-wheeled frame. When the frame is drawn forward in the direction of the line of turnips to be singled, the disc rotates without any gearing, and the hoes cut across the ridge at intervals, removing the plants to the extent of the width of the hoes used. It is made to work on the ridge or the flat, and the frame also carries a pair of flat hoes, which work between the drills in the ordinary way. It is a simple machine, and the illustration (fig. 2) will make its working clear. It was given a trial upon a piece of swedes drilled on the ridge, 24 inches apart, on a nice loam soil in excellent condition for the operation. It was found, however, that the roots were left in "bunches," and the machine would not dispense with the necessity for going over them again by hand before they were satisfactorily "singled."

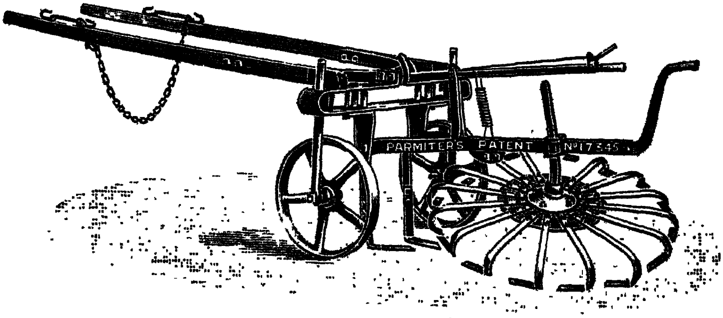

FIG. 2.—Parmiter's Turnip Singler.

Article 757.—*Mr. William McBride*, Merchant's Quay, Cork. "Turnip and Mangel Thinner." Price: single row, 10*l.* 10*s.*; double row, 12*l.* 12*s.*—A trial was given to this machine at the same time as the exhibit of Messrs. Parmiter. It can be made to thin one or two rows simultaneously, and consists of a frame mounted on two wheels (fig. 3). The axle drives by spur-gearing a second-motion spindle, on which is fixed a pulley containing an eccentric circular groove, whereby motion is transmitted to a vertical knife-arm through levers, giving a swinging to-and-fro motion to the knife across the line of plants, which it spaces according to the width of the knife. The depth of work is controlled by spring levers with balance weights.

In both of these last two machines, it was felt that little advance had been made in the endeavour to produce an implement which would effectually "single" roots, though they might be of service in "opening out" a crop in a busy or growing time when labour was scarce. There are, however, other implements which accomplish this more or less efficiently.

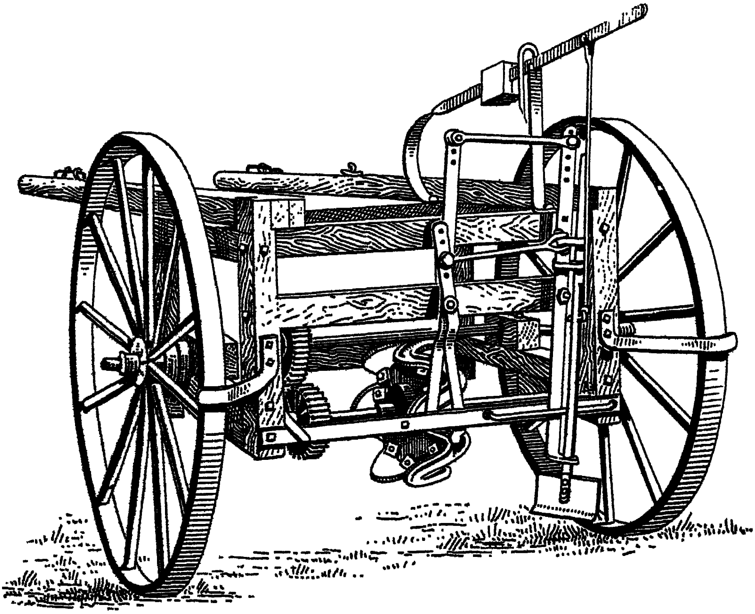

FIG. 3.—Turnip and Mangel Thinner.

Article 1206.—*Walter A. Wood Mowing and Reaping Machine Co*, 36 Worship Street, London, E.C. "Bristow's Patent New Turnip and Rape Feed for Drill." Price 7*l.* 10*s.*—Great hopes were entertained that this appliance might furnish some solution of the root singling problem, in the saving of seed as well as in obviating the necessity for the later operation of "singling." It is claimed that this appliance can be fitted to any drill, and it is said to be extensively used, and with most satisfactory results, in New Zealand. The seed is placed in hoppers, the bottom of each seed hopper being formed of a rotating brass drum having four little grooves or pockets cut in it. Each pocket is capable of accommodating one seed, and it is only the seed in the pocket which can escape from the hopper and fall down the drill coulter into the soil, one at a time. For some kinds of seed there is a little device which pushes them out of the pockets if they are inclined to stick. It is claimed that the work is done with perfect regularity, and that with suitable sprocket wheels the seeds can be drilled from 1 to 8 inches apart, and in rows having 8- to 14-inch centres (fig. 4).

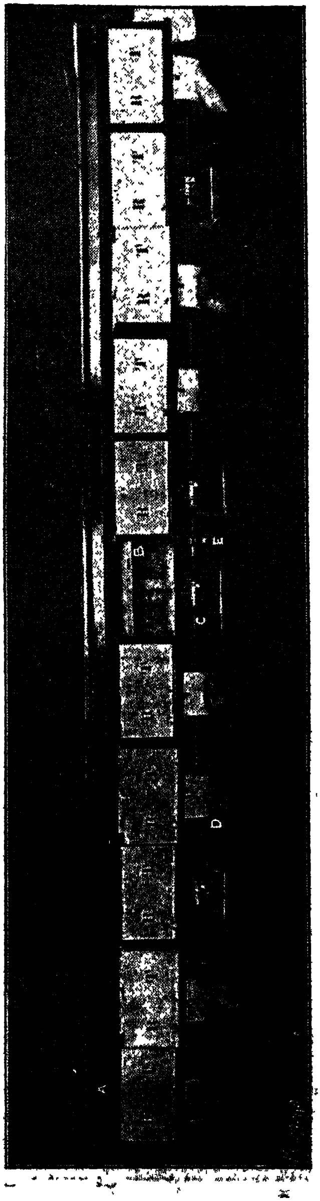

FIG. 4.—Bristow's Turnip and Rape Feed for Drill.

The machine consists merely of a set of seed distributing hoppers made to the standard size common in New Zealand, and was not exhibited with its own drill. The exhibitor was, however, very anxious to have it tried, and though he had not worked it himself before, he had the end cut off of it and mounted in a temporary manner on a small sized drill. Thus mounted, and without any preliminary trial, the implement was tested in the fodder yard, but obviously through want of adjustment the machine could not be got to work properly, and under such conditions no reliable opinion could be formed as to the efficiency of the mechanism.

We were, however, so favourably impressed with the possibilities of the contrivance that we recommended it for entry as a New Implement at next year's Meeting of the Society, under Number IX. of the Silver Medal Regulations. The Council having approved of this recommendation, it is to be hoped that if the implement is again tried the exhibitors will take care that a qualified person is in attendance to see to its proper adjustment.

Article 2757.—*Mr. W. T. Chafer*, 24 Christchurch Road, Doncaster. "Portable Poultry House." Price 4*l.* 10*s.*—It is well known that in order to keep large quantities of poultry in a healthy condition it is better to divide them into groups of, say, 25 or 30, rather than keep a very large head all together, and movable poultry houses are necessary for that purpose. The novelty in this exhibit lies not so much in the house itself—which is of the frequently adopted pattern constructed of wood—but in the patent adjustable wheels with which it is fitted. There are three of these, one at each of two corners, and one in the centre of the end opposite those on the corners. The latter wheel is a swivel allowing the house to turn on its own length. The house is not floored, and this saves the necessity for cleaning out, as it can easily and frequently be moved on to clean ground. The wheels can be had separately, and can be fixed to any other make of house. A man or a boy raises the house about 8 inches, when the wheel drops to the ground, and is automatically locked, supporting the house clear of the ground; and after moving to its fresh position the house is again slightly raised, and the locking bar then swings clear, and the house drops down to the ground again.

Crossley's Gas Plant.—In connection with their exhibit of gas engines, Messrs. Crossley exhibited a new gas-producer plant, from which the several gas engines on their stand were supplied with gas for working during the Show.

The plant consists of four parts, viz. gas producer, saturator, hydraulic box, and sawdust scrubber. A supplementary fan is required to be driven at starting by the engine in regular work, or by hand. Air is driven by this fan into the air inlet of the saturator. This air rises up through the saturator, and meets the hot gases coming down through a special arrangement of separated divisions. Also coming down from the top is a very small supply of water, which runs through all the divisions, both for air and for gas. The waste heat from the gas is to a large extent utilised in heating up the air and in saturating this heated air with a considerable volume of moisture in the form of low-pressure vapour. This air thence passes into a thin annular casing, and together with the vapour it contains is considerably raised in temperature as it passes down this annular casing; it rises up through the fuel in the producer, thus making the gas, which passes on as above described through the saturator, from the bottom of which it passes into a hydraulic box and a sawdust scrubber to the engine.

Crossley's patent producer would seem to have several special points about it. Poking and clinkering may be done without stopping. There are no grate bars to give any trouble, and, in fact, the producer should be able to work uninterruptedly for a very considerable period with reasonable care, although the work required of it may be variable. The fuel is introduced through fuel hoppers on the top, and there are internal arrangements which define the active depth of the fuel, keeping it always the same.

To enable the full economy to be obtained, the producer and the gas-pipe from the producer to the saturator and the upper box section of the saturator should be carefully covered with non-conducting composition; and as the pipe is very hot, this non-conducting composition should consist of some material that will stand a very high temperature, such as asbestos, in the form of pulp or otherwise.

It is easily managed and it is claimed that it will yield a constant and uniform quality of gas. By taking a separate branch pipe for gas to the ignition from the sawdust scrubber there is no difficulty whatever in keeping the ignition tubes thoroughly hot. No gasholder is considered necessary; the plant occupies very little room, and can practically be worked without being a nuisance, even in the middle of towns. The quantity of water required is small, and is stated to be about half-a-gallon an hour per H.P. A good deal of the water put into the saturator is evaporated and passes into the producer.

The plant seems an exceedingly workable one, but without actual trial it is impossible to put forward relative figures as to cost of production. It is claimed for the system that it can be arranged to work with bituminous as well as with anthracite coal, which is a matter of considerable importance.

In concluding this short report, my colleague, Mr. J. W. Kimber, and myself desire to acknowledge the courtesy extended to us by all the exhibitors, and to express our best thanks to the Stewards of Implements, Mr. Howard P. Ryland, Mr. J. Marshall Dugdale, and Mr. R. M. Greaves, for the excellent arrangements they made to facilitate our duties. We wish also to express our indebtedness to Mr. F. S. Courtney, the Society's Consulting Engineer, for his valuable assistance.

CHARLES P. HALL.

Woburn, Bedfordshire

Official Reports.

REPORT OF THE COUNCIL

TO THE

SIXTY-SECOND ANNIVERSARY GENERAL MEETING OF GOVERNORS AND MEMBERS OF THE SOCIETY.

HELD AT THE SOCIETY'S HOUSE

ON WEDNESDAY, MAY 22, 1901,

EARL SPENCER, K.G. (Trustee) in the Chair.

IN presenting to the Governors and Members a report upon the operations of the Royal Agricultural Society of England since the last half-yearly meeting on December 13, 1900, the Council feel it incumbent upon them, before proceeding to the ordinary business of the Society, to refer to the grievous loss which has in the interval befallen the Society and the Empire at large by the death, full of years and honours, of Her late Majesty Queen Victoria, to whose gracious patronage the Society is indebted for its Charter and for its title of "Royal."

2 Throughout Her long and glorious reign Her Majesty the Queen was unremitting in Her devotion to the manifold duties of Her exalted station, and endeared Herself to all Her subjects by Her constant sympathy with both their joys and sorrows. The formation of the Royal Agricultural Society of England was almost coincident with the accession of Her late Majesty to the Throne, and every Member of the Society will recall with feelings of pride and gratification that Her Majesty had not only been Patron of the Society for the long period of sixty-one years, but had honoured the Society by graciously accepting its Presidency in the fiftieth year of its existence. No class of the community was more devotedly attached to Her Majesty's Throne and person than the farmers of England; and grateful recognition is due in this report of the many important benefits that have accrued to the agriculture of this country from the keen personal interest which Her late

Majesty and the Royal Family have ever evinced in the welfare of the Society and of agriculture in general.

3. At their first Meeting held after the death of Her late Majesty, the Council drew up a loyal and dutiful Address of Condolence with His Majesty The King, for which His Majesty was graciously pleased to express His thanks through the Secretary of State for the Home Department. In view of the fact that His Majesty had manifested in the past so deep an interest in the Society's welfare (having been one of its Trustees for over twenty-one years, and President on no fewer than four occasions—at Manchester in 1869, at Kilburn in 1879, at Norwich in 1886, and at York last year—besides being Acting-President for Her late Majesty at Windsor in 1889), a humble petition has been presented to His Majesty that He would grant His Patronage to the Society: and to this request His Majesty has been pleased to accede. For this further mark of His Majesty's favour to the Society the grateful thanks of all interested in its success and prosperity are due.

4. The Earl of Derby, K.G. (a Vice-President), has been appointed to the vacant post of Trustee of the Society; Mr. J. Hungerford Arkwright has been appointed a Vice-President in the room of the Earl of Derby; and Mr. Alexander Henderson, M.P., of Buscot Park, Faringdon, Berks, has been elected a Member of the Council. The Honorary Membership of the Society has been conferred on Mr. Alexander Curtis Cope, M.R.C.V.S., Chief Veterinary Officer of the Board of Agriculture, and President of the Royal College of Veterinary Surgeons for 1900–1; upon Dr. James Cossar Ewart, M.D., F.R.S., Regius Professor of Natural History at the University of Edinburgh; and upon Professor John McFadyean, M.B., B.Sc., C.M., Principal of the Royal Veterinary College, in recognition of their distinguished services to the sciences bearing upon agriculture.

5. It has been customary on these occasions to mention the losses which have been sustained by the Society by death during the preceding half-year. Of past fellow-workers, the Council mourn the decease of Sir Archibald Macdonald, Bart. (a Member of Council for forty-two years, and a Trustee from 1871 to 1899); Mr. John Tremayne, of Heligan (a Member of the Council from 1889 to 1897); Veterinary-Col. George Fleming, C.B., LL.D. (an Honorary Member of the Society since 1878, and the contributor of several important papers on Veterinary subjects to the Society's Journal); and Mr. J. J. Forrester, Manager since 1896 of the Society's Experimental Farm at Woburn, who met his death in South Africa on March 13 last, from wounds received in a skirmish at Lichtenburg whilst serving in the Imperial Yeomanry.

6. Amongst the Governors and Members of the Society who have died since the last Report are: The Earl of Arran, the Earl of Galloway, K.T., the Earl of Harrowby, Lord William Beresford, V.C., Lord Lionel Cecil, Lord Armstrong, Lord Leconfield,

Lord Kensington, Sir J. W. Maclure, Bart., M.P., Sir J. H. Thursby, Bart., Maj.-Gen. Sir William Crossman, K.C.M.G., Mr. Charles E. Ashworth, Mr. Henry Blyth, Mr. Jacob Fair, Mr. Edward K. Fisher, Capt. Grenville-Wells, Major F. F. Hallett, Colonel G. M. Hutton, and Mr. Stanley Leighton, M.P.

7. In common with all other Societies and Institutions that depend for their support upon voluntary subscriptions, the Society has suffered considerably this last year from the effects, direct and indirect, of the war in South Africa. It has had to lament the loss of a number of its younger Members, who, being engaged in farming and estate duties at the time of the creation of the Imperial Yeomanry, went out to South Africa, and there found a premature death from wounds or disease. The increased calls upon a substantial number of other Members have led them to withdraw their subscriptions. The Council have never ignored that the decision to discontinue the system of migratory Shows, announced in their Report of May, 1900, could not be expected to meet with universal acceptance by the Members, and a certain, though relatively inconsiderable, number have resigned in consequence. In past years the Council have been reluctant to take the extreme step of striking Members from the Registers who had fallen into arrears with their subscriptions, but who had given no intimation of their wishes as to their continuance of Membership or otherwise. As, however, the number of such Members from whom no reply could, despite repeated applications, be obtained, had become considerable, the Council have felt it necessary, in the general interests of the Society, that these Members should be removed from the Registers, after formal notice has been given to them of such intention.

8. The Council have therefore been engaged, in connection with the preparation of the new Registers of Members which it has been usual to compile at the commencement of every decade, in the preliminaries required by the Bye-laws for the removal from the List of Members of the subscribers who had ceased for more than two years to pay their annual contribution to the Society's funds, and who had not replied to the numerous applications for their arrears made to them by direction of the Council. A considerable number of such Members have been ascertained to be deceased, and others have, whilst paying their arrears, tendered their resignations: the remainder being struck off the books in accordance with Bye-Law 11. In the figures which follow, no account has accordingly been taken of any Member whose subscription is more than two years in arrear.

9. The diminution of the roll of Members by deaths (204), voluntary resignations (314), and by the action of the Council under the Bye-laws as to arrears or absence of addresses (159) has to some extent been repaired by the election of 2 new Governors and 86 new Members during the half-year; but the Council desire to emphasise the importance of a considerable and constant flow of

new Members if the Society's operations are to continue on their present scale.

10. The exact state of the Registers on May 1, 1901, is as follows :—

8	Foundation Life Governors (Members elected before the granting of the Charter on March 26, 1840) ;
70	Governors paying an annual subscription of 5*l.* ;
94	Life Governors ;
6270	Members paying an annual subscription of 1*l.* ;
3448	Life Members ;
116	Life Members by Examination ;
27	Honorary Members ;

10,033 Total number of Governors and Members, a nominal reduction of 633 from the total of 10,666 Members reported to the Anniversary General Meeting held on May 22 last year.

11. The Balance-Sheet for the year 1900 has been duly examined and certified as correct by the Auditors appointed by the Members, and by the professional accountants (Messrs. Welton, Jones, & Co.) employed by the Society ; and it is printed as an Appendix to this Report [see p. xii], with the two appended Statements of (*a*) Ordinary Income and Expenditure, and (*b*) Receipts and Expenditure at the York Meeting. The latter has already been published on pp. ccx–ccxiii of the last quarterly number of the Society's Journal, and was commented on in the Report of the Council to the General Meeting held on December 13, 1900 (Vol. for 1900, pp. 698 and 699). It may, however, be desirable for greater clearness to repeat the explanation then given as to the system under which the Society's accounts are made up :—

> (9.) The system of accounts adopted by the Society for some years past was fully dealt with in the Report to the General Meeting held on December 9, 1897, in which it was explained that the Society's accounts are rendered each year in two sections, showing respectively (*a*) the ordinary income and expenditure on the departments of the Society's public work other than the shows, and (*b*) the receipts and expenditure at the Country Meetings, the results of both being brought together in a general balance-sheet, showing the financial position of the Society as a whole. It was pointed out in 1897 that whilst all the members of the Society participate in its ordinary privileges, only a proportion of them attend the shows regularly, and less than 5 per cent. exhibit live stock at the Meetings. For the maintenance of the Society's ordinary operations on their present scale, it was indicated that "the annual subscriptions received from the members who subscribe 1*l.* a year would obviously be insufficient, were it not for a contribution to the revenue of the year from the Reserve Fund, in respect of the share of the expenses due from the Life Governors and Members. This Reserve Fund practically represents the unexhausted balance of the life compositions, and it is now [1897] only preserved intact by the surpluses at recent Shows. In the event of a financially unremunerative Country Meeting, it is from the Reserve Fund that the deficit would have to be made good." Hence it is that the unexpected losses from the Show

of the present year and those of 1898 and 1899, have caused a shrinkage in the Reserve Fund greater than the reduction through deaths and the effluxion of time of the Society's liabilities to its life members.

12. The obligation imposed upon the Council of administering a Society of 10,000 members, of whom considerably more than a third are Life Members from whom no annual subscription is received, leaves the Council no alternative in the "lean years" from which the Society has lately suffered but to trench on the invested capital which they have been endeavouring to preserve as a Reserve Fund, from which to pay to the income of the year the share of the current expenses due from the Life Governors and Members who pay no annual subscription. Each year the Society's liabilities to the body of Life Members of course diminish by the effluxion of time; but the Reserve Fund is unfortunately being depleted much more rapidly than the liabilities decrease, mainly through the serious losses on the Society's last three Shows. The Council have under their anxious consideration the question of the limitation of the risks for which the Society, with diminished resources, now makes itself responsible in connection with the Shows; but the matter is one of great complexity and difficulty, and does not admit of an immediate solution.

13. The general result of the year's working is that the total assets of the Society on December 31, 1900—including invested capital (17,823*l.*), fixtures, furniture, machinery, country meeting plant, &c.—were 31,324*l.*, as against 37,419*l.* at the end of 1899, a diminution of nearly 6,100*l.*, accounted for as follows:—708*l.* for depreciation, 3,516*l.* deficits of the Income and Expenditure Accounts, and 1,871*l.* difference between the amount added to and that taken from the Reserve Fund under the system explained above.

14. The Council regret to have to report that Mr. A. H. Johnson, one of the three Auditors appointed by the Members, has recently been obliged to undergo an operation for his eyesight, which prevented him from attending the recent Audit of the Accounts for 1900. Mr. Johnson has felt it incumbent upon him, under these circumstances, to tender his resignation of the post of Auditor, the duties of which he has fulfilled with so much advantage to the Society for a long series of years. It being important that the Auditors should be Members of the Society who reside in or near London, Mr. Hubert J. Greenwood, of 28 Chapel Street, Belgrave Square, S.W., a Member of the Society since 1891, has been nominated to fill the vacancy caused by Mr. Johnson's resignation, and is willing to serve if his appointment is acceptable to the Members, in whose hands the selection of Auditors rests.

15. As already announced, the Society's Meeting of the present year will be held at Cardiff from Wednesday, June 26, to Monday, July 1 next. In the Implement Department, the number of feet of Shedding (exclusive of open Ground Space) actually allotted is

11,651 feet in 358 Stands, as against 14,772 feet at York last year, 12,200 feet at Maidstone in 1899, 15,491 at Birmingham in 1898, and 11,749 feet at the previous Meeting at Cardiff in 1872.

16. For the Prizes of 40*l.* and 20*l.* offered by the Society for Portable Oil Engines, eight entries have been received, the trials of which will take place in the Cardiff Showyard in the week previous to the Show. For the similar Prizes offered for Agricultural Locomotive Engines, the Council regret to report that no entry has been received; and for the Prize of 15*l.* offered by the Society for the best small Ice-making Plant suitable for a Dairy, only one entry has been made. Thirty-nine Machines and Appliances of various descriptions have been entered as "New Implements" for the Society's Silver Medal.

17. In view of the issue of this Report at an earlier date than before, the detailed figures as to the entries of Live Stock, Poultry, and Produce, the lists for which do not finally close until Wednesday, May 15, cannot now be stated in the body of the Report; but the statistics will be laid before the Members at the Meeting on the 22nd instant.

18. In addition to the Prizes and Competitions referred to in the December Report, Competitions have since been arranged for Prizes offered by the Cardiff Local Committee for Horse-jumping and Butter-making. Three Prizes of 20*l.*, 15*l.*, and 10*l.* are offered in the four following classes for Horse-jumping Competitions at Cardiff, to be held on the Thursday, Friday, and Saturday of the Meeting; and there will, in addition, be a Consolation Class (with prizes of 10*l.*, 5*l.*, and 3*l.*) on Monday, July 1, open only to animals which have competed but have not won a prize in any of the Classes A to D:

CLASS A.—Confined to Animals exhibited in Classes 3, 4, and 5 in the Cardiff Prize Sheet, which are not to compete in Classes B and C.

CLASS B.—MARES or GELDINGS, 15 hands 2 inches and over.

CLASS C.—MARES or GELDINGS, above 14 hands 2 inches and under 15 hands 2 inches.

CLASS D.—PONY MARES or GELDINGS, 14 hands 2 inches and under. (Animals exhibited in other Classes at the Cardiff Meeting will be allowed to compete in this Class).

The entries for these Competitions will close on the day before each Class is judged, and the Entry Fees received will be equally divided among the Prize Winners in each class in augmentation of the Prizes.

19. Prizes amounting to 44*l.* will also be given by the Cardiff Local Committee for Butter-making Competitions in the following Classes:

CLASS I. (*Thursday, June* 27, 1901).—Open to persons who have received instruction in the GLAMORGANSHIRE Dairy School.

CLASS II. (*Friday, June* 28, 1901).—Open to persons who have received instruction in the MONMOUTHSHIRE Dairy School.

CLASS III. (*Saturday, June* 29, 1901).—Open to Dairymen, Dairymaids, or Members of a Farmer's family resident in the District (F) for which this year's Meeting is held, viz., Gloucester, Hereford, Monmouth, Salop, Stafford, Warwick, Worcester, and South Wales.

CLASS IV. (*Monday, July* 1, 1901).—Open only to Prize-winners in Classes I., II. and III.

20. On Wednesday, June 26, the charge for admission will be 5*s*., and all the Classes of Live Stock, Poultry and Produce will then be judged. On Thursday and Friday the charge for admission will be 2*s*. 6*d*. each day; and on the last two days, Saturday and Monday, it will be 1*s*. each day. There will also be two Parades daily except on the Judging Day (Wednesday, June 26). The Band of the Royal Marines has been engaged to give selections of music during the last four days of the Meeting; and the general arrangements will be similar to those of previous years.

21. In accordance with the Scheme of Rotation of Districts as settled in 1892, the Society's Meeting of 1902 (the last of the Series) would normally have been held in District G, which comprises Cheshire, Lancashire, and North Wales; and it was announced in the Report of May, 1900, that, provided some suitable and adequate site were offered for the purpose, next year's meeting would be held at some town in that district. As, however, up to February, 1901, no invitation had been received from any town in District G, the Council empowered the Committee of Selection to consider invitations from towns in any other part of England that might be willing to receive the Society in 1902. On April 3 last, formal invitations received from the towns of Blackpool and Carlisle were considered by the Council; and it was eventually decided that the Meeting of 1902 should be held at the latter City.

22. With the Meeting of 1902 the present system of migratory Shows will, as previously announced, come to a termination; and the Council have had under their serious consideration the arrangements to be made for the holding of future Shows. It was announced to the Members in December that the Special Committee whose labours have been referred to in previous reports, were actively engaged in endeavouring to find a site in the neighbourhood of London suitable for a Permanent Showyard for the Society. Since then the Committee have held numerous meetings and conferences, and have reported that, after careful consideration of a number of sites which had been suggested to them in various parts of London, they had finally arrived at the unanimous conclusion that the only one of these suggested sites that complied with the Society's requirements was one at Twyford Abbey, between Willesden Junction and Ealing, about seven miles from the Marble Arch. They have reported their opinion that this site is admirably adapted for the requirements of the Society, and that no site so favourable for the Society's operations is, in their view, likely to be found in the neighbourhood of the Metropolis. After full deliberation, the Council have decided to enter into an arrangement under which the Society will obtain a lease for 50 years of 100 acres of this land at a rental of 1,000*l.* per annum. An option of eventual purchase of the site, on terms defined, has also been obtained.

23. The question of the capital expenditure necessary for equipping this site with the requisite buildings has of course engaged the serious attention of the Council. The works for the equipment of the site may be divided into (*a*) those absolutely necessary, viz. draining, levelling, gas and water piping, roads and fencing, and (*b*) those which, while not essential, are necessary if proper advantage is to be taken of having a fixed site, such as providing permanent stabling and some of the more substantial structures of a showyard, the provision of which would admit of the site being utilised at an early date for other objects besides the Society's Show. Most of the former class of work has in the past been carried out at the expense of the Local Committees, but this source of income will no longer be available. Whatever sum may be required for equipment expenses must be raised either by loan or by voluntary contributions. It is manifest that the Society's present financial position would not enable it to borrow at interest anything like the capital sum required for the equipment of a Permanent Showyard without seriously endangering the whole future of its operations apart from the Shows. The Council think, therefore, that efforts should be made to obtain, from those specially interested in the continuance of the Shows and in the welfare of the Society, contributions by way of gift to these equipment expenses, so as to diminish the heavy annual burden which would otherwise fall on the Society for loans granted on necessarily stringent conditions as to payment of interest and repayment of capital.

24. Reference was made in the Report of the Council in December last to the reasons which had led to the Council deciding to issue the Society's Journal in future in one bound volume annually, instead of in quarterly parts. It is contemplated to issue the first of these annual volumes in the autumn, and to include in the volume one or more articles on special subjects, besides the usual Reports by the Consulting Scientific Officers of the Society, the Reports and Awards connected with the Cardiff Meeting, and the Results of the various investigations carried out at the Society's Experimental Farm at Woburn.

25. The number of samples sent by Members for analysis to the Society's Chemical Laboratory during the past six months has been slightly in excess of the number during the corresponding period of last year. The total is 353, as against 314 in 1900. Instances continue to be brought before the notice of the Chemical Committee in which purchased articles, more particularly feeding stuffs, have been found to be inferior, wrongly described, and even adulterated. This shows the continued necessity of insisting on purchases being made under a definite guarantee, and of checking deliveries by analysis.

26. At the Woburn Experimental Farm the feeding experiments conducted through the winter season have been, in the case of sheep, on the feeding with mangels from the commencement (November 9, 1900), and also on the use of gorse as a substitute for hay. It was found that the sheep fattened perfectly well, and without any drawbacks, when fed on mangels instead of swedes, and that they were ready earlier for the butcher than when fed on swedes. Gorse proved a useful food, but the results were slightly inferior to those obtained by the use of hay. The experiments with bullocks were upon the possible advantage of supplementing an ordinary diet of cake, corn, roots, and hay with condimental foods, such as spice, locust bean, and sugar (treacle). These are not yet concluded.

27. Progress is being made with the usual field experiments and with the investigations of various agricultural problems, including the eradication of farm weeds. At the Pot-culture station experiments are being continued in connection with Hills' Bequest.

28. During the half-year much attention has been given to the value of seeds, and reports have been supplied to Members of the Society in regard to the purity and germination of 116 samples of different seeds. A disease in the cherry orchards of Kent, which has seriously affected the cherry crop, has been investigated by the Society's Consulting Botanist, and a description and figures of the disease have been printed as a leaflet and extensively circulated in Kent and other fruit-growing districts. The disease will be made the subject of further study during the coming season. Advice has been given as to diseases in wheat and clover and on the properties of certain plants.

29. As usual during the winter season, the Zoological Department has been chiefly concerned during the past six months with pests injurious to stored produce, and with such insects as are troublesome all the year round. Some of the more important applications have had reference to forestry, and advice has been given with regard to various insects attacking plantations of coniferous and other trees. Pests attacking various bulbs have also been inquired about. Spring applications have so far been fewer than usual, no doubt on account of the lateness of the season.

30. The facts relating to the occurrence of the contagious diseases of animals during the last six months are in some respects far from satisfactory. Throughout the period occasional outbreaks of foot-and-mouth disease have continued to crop up, glanders has been increasingly prevalent, and there has been a very serious recrudescence of swine-fever. Judged by the recent weekly returns, the last of these diseases is now more prevalent than it was at any period during the past three years. As compared with recent years, anthrax has maintained its position during the period. One case of rabies has been detected during the past six months.

31. The number of morbid specimens forwarded during the past half-year to the Department of Comparative Pathology and Bacteriology, established at the Royal Veterinary College by the aid of the annual grant of 500*l.* from the Society, was 272. During the same period local investigations have been carried out regarding a number of serious outbreaks of disease, including contagious abortion among mares, yew poisoning in cattle, and contagious mammitis among cows. Some experimental investigations have also been in progress at the Royal Veterinary College with regard to the immunisation of animals against tuberculosis, the treatment of parasitic gastritis in cattle, and the causation of some obscure cases of blood-poisoning in horses.

32. The Second Examination for the National Diploma in Agriculture was, by the courtesy of the authorities of the Yorkshire College at Leeds, held in the Great Hall of that College in the week commencing the 6th instant. The examination for this Diploma is conducted by a joint Board, composed of representatives of the Highland and Agricultural Society of Scotland and of this Society; and it has to be taken by the candidates in two Parts, at intervals of a year. For Part I. of the Examination 42 candidates entered this year, 16 being students who had failed in passing Part I. in 1900. As the result of the Examination 20 candidates (including 10 who failed last year) succeeded in passing in Part I.; 20 failed, and 2 were absent. In 1900 seven candidates passed in Part I. only, becoming, therefore, entitled to sit for Part II. this year; and six of these candidates presented themselves at the recent examination. All but one succeeded in passing Part II., and are therefore entitled to receive the National Diploma in Agriculture. Their names (in order of merit) are—

1. ALBERT WILLIAM OLDERSHAW, Midland Agricultural and Dairy Institute, Kingston, Derby.
2. JOHN MONTGOMERIE HATTRICK, West of Scotland Agricultural College, Glasgow.
3. BERNARD WILLIAM BULL, Ramsden, Billericay, Essex.
4. SIMON BLORE, University College of Wales, Aberystwyth.
5. THOMAS YOUNG, Junior, West of Scotland Agricultural College, Glasgow.

33. The Annual Examinations held in the Autumn for the National Diploma in the Science and Practice of Dairying will be held as before at the Reading College and British Dairy Institute (for English candidates) from September 23 to 26 next, and at the Scottish Dairy Institute, Kilmarnock (for Scottish candidates), from September 30 to October 3. The entries for both these Examinations will close on August 31, 1901.

By order of the Council,

ERNEST CLARKE,

Secretary.

13 Hanover Square, London, W.

REPORT OF THE COUNCIL

TO THE

HALF-YEARLY GENERAL MEETING OF GOVERNORS
AND MEMBERS OF THE SOCIETY,

HELD AT THE SOCIETY'S HOUSE

ON THURSDAY, DECEMBER 12, 1901,

H.R.H. PRINCE CHRISTIAN, K.G. (President), in the Chair.

THE Council have to report that during the half-year which has elapsed since the Anniversary General Meeting in May last 4 new Governors and 117 new Members have joined the Society, and 6 Members have been re-instated under Bye-law 12, whilst the deaths of 1 Life Governor, 1 Annual Governor, 36 Life Members, and 47 Annual Members have been reported. A total of 11 Members have been struck off the books under Bye-law 10, owing to absence of addresses; 13 under Bye-law 11, for arrears of subscription; and 21 have resigned.

2. Since the General Meeting in May last, the Society has had to deplore the deaths amongst others of Lord Wantage, V.C., K.C.B., of Lockinge Park, Berks, and Mr. Robert Holmes White, of Boulge Hall, Suffolk, both of whom were Governors of the Society, and of the following Members :—Lord Bateman; Sir John Talbot Power, Bart.; Sir Joseph Pulley, Bart.; Colonel William Agg, of Cheltenham; Mr. Edmund Ashworth, of Egerton; Dr. Thomas Bond; Mr. Thomas Chalk, of Linton; Mr. Emil Heinemann; Mr. Robert Johnson, of Hollesley Bay; Mr. G. A. Lepper, F.R.C.V.S., of Aylesbury; Professor Dr. Maercker, of Halle, Germany (one of the Honorary Members of the Society); Mr. J. L. Naper, of Loughcrew; Mr. A. J. Stanton; Mr. Martin Hope Sutton, of Reading; and Mr. Henry Wallace, of Trench Hall, Newcastle-on-Tyne.

3. The total number of Governors and Members now on the Register is 10,054, divided as follows :—

8 Foundation Life Governors (Members elected before the granting of the Charter on March 26, 1840) ;
70 Governors paying an annual subscription of 5*l.* ;
95 Life Governors ;
6,289 Members paying an annual subscription of 1*l.* ;
3,449 Life Members ;
115 Life Members by Examination ;
28 Honorary Members ;

10,054 Total number of Governors and Members, as against a total of 10,033 Members on the Register on May 1, 1901, as reported to the Anniversary General Meeting on May 22 last.

4. Mr. William Scoby, of Hobground House, Sinnington, Yorkshire, has been elected to fill a vacancy on the Council. In consideration of their distinguished services to agricultural science, the Council have elected as Honorary Members of the Society Dr. D. E. Salmon, Chief of the Bureau of Animal Industry of the United States Department of Agriculture, and Dr. B. Bang, Professor at the Royal Veterinary College, Copenhagen.

5. The Society's Sixty-second Meeting, held at Cardiff from June 26 to July 1, 1901, proved highly successful from the point of view of attendance of the public ; although in numbers the exhibits failed to reach the average standard of recent years. Favoured, during nearly the whole time, by excellent weather, the attendance of the public more than realised anticipations, and resulted in a total of 167,423 paying visitors. The excellent attendances on the two 2*s.* 6*d.* days were satisfactory financial features of the Show. The receipts and expenditure of the Meeting have been submitted to and examined by the Society's Accountants and by the Auditors appointed by the Members, and, subject to final audit when the general balance-sheet for 1901 is made up at the end of the present year, they show an excess of receipts over expenditure of 1,998*l.* 4*s.* 4*d.*

6. The Meeting of the Society in the year 1902 will, as previously announced, be held at Carlisle. In view of the ceremonies in connection with the Coronation of His Majesty King Edward VII., it was necessary that the date of the Show should be fixed somewhat later than usual. The Council have therefore decided that the Carlisle Meeting shall open on Monday, July 7, 1902, and close on the following Friday evening. The Implement Yard and Dairy will be open to Members of the Society and the public on the previous Saturday, July 5, the charge for the admission of the public on that day being fixed at 1*s.* each person.

7. The final date for the receipt of entries in the Implement Department has been fixed for Saturday, March 15, 1902, although Post Entries at double fees may be tendered up to Tuesday, April 1,

1902. For Live Stock, including Horses, Cattle, Sheep, and Pigs, the Entries will close on Tuesday, April 15, at 10*s*. per Entry; on Wednesday, April 30, at 15*s*. per Post Entry; and finally, on Thursday, May 15, at 1*l*. per Late Entry. For Poultry and Farm Produce, the Entries will close on Wednesday, April 30, at 2*s*. 6*d*. per Entry, and finally, on Thursday, May 15, at 5*s*. per Post Entry. Double fees will be payable by non-Members of the Society. An Exhibitor may make in the Classes for Live Stock and Poultry as many Entries in the Class as there are Prizes offered in that Class. Provision will be made for enabling Exhibitors who have already entered animals to substitute for them entries of other animals in the same Class, up to Saturday, May 31, on payment of a Registration Fee of 5*s*. (Non-Members, double.)

8. The Prize Sheet for Stock, Poultry and Produce has been definitely settled, and will be issued immediately. The Prizes offered in all departments (exclusive of Champion Prizes and Medals offered by various Breed Societies) amount in all to 6,001*l*. 5*s*., to which the Carlisle Local Committee contribute 1,250*l*. and various Breed Societies 245*l*. The special prizes offered by the Carlisle Local Committee include seven classes for Hunters, two for Riding Cobs, one for Hackneys, one for Ponies, three for Fell Ponies, one for Polo Ponies, three for Harness Horses, six for Agricultural Horses, two for Draught Horses to be exhibited on the Thursday of the Meeting only, and five for Horse Jumping Competitions; two classes for Dairy Cows, two for White Shorthorn Bulls, four classes for Polled Blue-grey Cattle, two classes for Cross-bred Sheep (Black-faced Mountain or Herdwick Ewes, with Border Leicester or Wensleydale Rams); and prizes in four classes for local competitions in Butter-making.

9. The Classes for Horses provided by the Society itself will include Hunters, Cleveland Bays and Coach Horses, Hackneys, Ponies, Mountain and Moorland Ponies, Shires, Clydesdales, and Suffolk Horses.

10. In the classes for Cattle, prizes will be offered by the Society for the Shorthorn, Hereford, Devon, Sussex, Welsh, Red Polled, Aberdeen Angus, Galloway, Highland, Ayrshire, Jersey, Guernsey, Kerry, and Dexter breeds. The maximum age of Bulls competing for the prizes offered by the Society will be, as a rule, limited to four years, and that of cows to six years, whilst the competition for cows of three years old and upwards will, as was the case at Cardiff, be restricted to animals "in milk."

11. The Classes for Sheep will include Oxford Downs, Shropshires, Southdowns, Hampshire Downs, Suffolks, Lincolns, Leicesters, Cotswolds, Border Leicesters, Kentish or Romney Marsh, Wensleydales, Cheviots, Black-faced Mountain, Lonks, Herdwicks, and Welsh Mountain. The prizes for Pigs will, as at Cardiff, include the

Large White, Middle White, Small White, Berkshire, Tamworth, and Large Black breeds, but the classes formerly provided for pens of three boar pigs will be replaced by classes for single animals.

12. Offers of Prizes in augmentation of various sections of the Prize Sheet have been received direct from the following Breed Societies :—The Polo Pony Society, six classes for Polo ponies ; the Lincolnshire Red Shorthorn Association, four classes for Lincolnshire Red Shorthorn Cattle ; the Oxford Down Sheep Breeders' Association, two 3rd prizes for Lambs ; the Shropshire Sheep Breeders' Association, one class for Shropshire Rams ; the Lincoln Longwool Sheep Breeders' Association, one class for Lincoln Rams.

13. Prizes will be given by the Society for useful descriptions of Live Poultry ; for Butter ; for Cheddar, Cheshire, Stilton, Wensleydale, Wilts, Double Gloucester, and other British Cheeses (Cream Cheese excepted) of 1902 make ; for Potted Butter and Potted Cheese, suitable for export ; and for Cider and Perry. The British Beekeepers' Association will continue their prizes for Hives, Honey, and Bee Appliances.

14. The Horse Shoeing Competition will be continued at Carlisle in two Classes open to the United Kingdom—viz. for Hunters and Cart Horses—and Prizes amounting to 16*l.* will be offered in each class. The Worshipful Company of Farriers have offered to present the Freedom of their Guild, free of cost, to the winner of the First Prize in each Class, provided the Judges consider that sufficient ability has been displayed. The Registration Committee of the Farriers' Company will also admit, free of charge, the First Prize winners in these Competitions to the Official Register of Farriers or Shoeing Smiths, and, on payment of the usual fees, all other competitors who shall duly satisfy the Judges of their efficiency.

15. With the Carlisle Meeting of 1902, the present system of migratory Shows will, as previously announced, come to an end ; and the Council have now under their anxious consideration the preliminary arrangements for the holding of future Shows on the permanent site between Willesden and Ealing, which, as reported to the Anniversary General Meeting in May, has been acquired for this purpose. Instead of taking a lease of this land, as at first proposed, the Council have been able to negotiate the purchase outright of the freehold of 102 acres at a price of 25,800*l.*, to which must be added a contribution of 1,000*l.* towards the cost of making the necessary roads, and the necessary expenses of the transfer of the land.

16. As it was manifest that the Society's financial position would not admit of so considerable an outlay as the sum necessary for the purchase of this land and its preparation and adaptation for the purposes of a showyard, it was decided to make a public appeal to those interested in the national agricultural show, and in the success of agriculture in this country, for financial contributions to the project. His Majesty The King, the Patron of the Society, was graciously pleased to express his approval of the scheme, and to head the subscription list with a contribution of 250 guineas, and His Royal Highness the Prince of Wales has also contributed 100 guineas. The total amount of the promises received to date is 27,853*l.* 6*s.* 6*d.*, given by 376 subscribers. This, though sufficient to warrant the Council in completing the purchase, does not make provision for all the expenditure for equipping the site with the necessary appliances (drainage, gas and water piping, fencing, and roads), or for the requisite buildings (such as permanent stabling and the more substantial structures of a showyard); and the Council trust, therefore, to receive further contributions towards these objects.

17. The contents of the volume of the Journal for 1901 have now been settled, and the volume (No. 62 of the entire series) will be issued shortly to Members, suitably bound. Besides the detailed reports on the various Departments of the Cardiff Show, the reports on the Field and Feeding Experiments at Woburn, and the Annual Reports for 1901 of the Society's scientific advisers, the volume will contain a sketch of Agriculture during the Victorian Era by Mr. Rowland E. Prothero, M.A., M.V.O., and papers—amongst others—by Mr. Neville Grenville on Cider-making, by Professor McFadyean on Abortion and on Tuberculosis, by Mr. Douglas A. Gilchrist on the Education of the Young Farmer, and by Professor Percival on Varieties of Hops.

18. During the year 1901, 682 samples have been analysed for members in the Society's Laboratory, this number comparing favourably with 660 examined during the preceding year. Attention has been specially directed to a new form of adulteration of decorticated cotton cake, a practice having been brought to light of grinding and remixing with the decorticated (or husk-removed) meal the husks that have been taken out in the process of decorticating. The objectionable process of adding borax or other chemicals to cotton cake in order to preserve its bright colour and give it a fresh appearance is also frequently met with, and purchasers are advised to buy their feeding stuffs free from "chemicals," but sound and fresh naturally. The supply of fertilisers generally has been very satisfactory, an improvement being noted more particularly in the case of Basic Slag, while Peruvian Guano of high quality has again been on sale.

19. The usual Field Experiments have been continued at the Society's Experimental Farm at Woburn, and the Feeding Experiments for the winter season 1901–2 are now in progress. The latter comprise the feeding of Sheep with a full and a limited supply of Roots, and the substitution of Hay by Gorse, and the feeding of Bullocks with purchased food (oil-cake) compared with the use of home grown (principally starchy) food. Through the generosity of the Duke of Bedford considerable improvements, in the provision of

an oil-engine and better machinery, are now being carried out at the farm.

20. Experiments under the Hills Bequest have been carried on a further stage, and have been supplemented by others of general agricultural interest. The returns of meteorological observations have been kept up and duly reported to the Meteorological Office. Further experiments on the eradication of farm Weeds have been conducted both at the Pot-Culture station and on fields in the neighbourhood of the Woburn Farm.

21. The Consulting Botanist has examined and tested numerous samples of seeds on behalf of the Members of the Society. He has supplied information as to weeds in pastures and cereal crops. Advice has been given as to laying down pastures and lawns. Several injuries to plants have been investigated. The most serious was a parasitic fungus on the leaves of the cherry, which caused a considerable reduction in the yield of fruit in the Kent orchards in 1900, but was fortunately checked by the favourable climatic conditions of 1901. Other injuries also due to fungi on cherry, peach, rose, bean, clover, turnip, wheat, barley, Yorkshire fog, tulip, and winter aconite, have been investigated.

22. During the past six months the Zoologist has dealt with inquiries concerning most of the ordinary agricultural pests. Young fruit and forest trees seem to have suffered more from insect attacks than for many years past, and some of the pests sent for identification were rare insects, not previously recorded as injurious. Much time was devoted to the investigation of the life-history of the Black Currant Gall-mite (*Eriophyes ribis*), and a full account of the results of this research is given in the Zoologist's Annual Report, which will appear in the next Volume of the Journal.

23. It is satisfactory to be in a position to report that the country has again become free from foot-and-mouth disease, no case having been reported since April 12, 1901. After a period of exceptional prevalence, swine-fever has within the past few months shown a considerable decline, but, notwithstanding this, the outbreaks for the year are likely to be several hundreds in excess of those for any year since 1897. The latter statement also applies to glanders, of which the outbreaks are now nearly twice as frequent as they were in 1898. Only one case of rabies has been reported during the current year, viz. in April last, and there is good reason to hope that the disease has been exterminated.

24. The number of morbid specimens forwarded since January 1 last to the Department of Comparative Pathology and Bacteriology established at the Royal Veterinary College by the aid of the annual grant of 500*l.* from the Society has been 435. An experimental investigation bearing on the possibility of immunising cattle against tuberculosis has been continued, and some very remarkable results, of which the particulars will be communicated in the next Annual Report from the College, have been obtained. Some experiments intended to throw light on the relationship between human and bovine tuberculosis have also been carried out at the College under instructions from the Council of the Society.

25. As the result of the Examination of Students of the Royal Veterinary College in Cattle Pathology, including the diseases of Cattle, Sheep, and Pigs, Mr. J. Harrison, of Belsfield Cottage, Bowness, Windermere, has been awarded the Society's Silver Medal, and Mr. F. W. Robards, of Camden House, Dartford, Kent, the Bronze Medal.

26. The Examinations for the National Diploma in Dairying were held this year for English students at Reading College and the British Dairy Institute, Reading, from September 23 to 27, 1901; and for Scottish students at the Dairy School, Kilmarnock, from September 30 to October 4. Eighteen candidates were examined at Reading, and of these the following six satisfied the Examiners, and have therefore been awarded the National Diploma in the Science and Practice of Dairying:—

MARIANNE P. GARDNER, Ellerslie, Gosforth, Cumberland.
EDWARD G. HARDY, Old Hall Farm, Great Steeping, Spilsby, Lincolnshire.
ANNIE INGLIS, Midland Dairy Institute, Kingston, Derby.
ELIZABETH C. HOARE, British Dairy Institute, Reading.
BERTHA M. LA MOTHE, British Dairy Institute, Reading.
SAMUEL LESSER, 14, Westbourne Terrace, London, W.

Eleven candidates were examined at Kilmarnock, and two of them satisfied the Examiners, and have been awarded the Diploma, viz:—

BEATRICE MARY MACARA, Ardmore, St. Annes-on-Sea.
CATHERINE ELLA BEATRICE THOMPSON, Mill of Wester Coull, by Aboyne, Aberdeenshire.

27. The National Agricultural Examination Board will hold a further Examination next May for the National Diploma in Agriculture. The entries for this Examination will close on Monday, March 31, 1902. Examinations for the National Diploma in Dairying will also be held in the autumn, the last date for the receipt of applications to sit for such Examination being Saturday, August 30, 1902.

By Order of the Council,

ERNEST CLARKE,
Secretary.

13 Hanover Square, London, W.

ANNUAL REPORT FOR 1900 OF THE PRINCIPAL OF THE ROYAL VETERINARY COLLEGE.

RESEARCH LABORATORY.

DURING the year 1900 there were 343 morbid specimens forwarded for examination to the Laboratory established at the Royal Veterinary College in 1890 for research in comparative pathology and bacteriology, and which has since been maintained by the aid of an annual grant of 500*l.* from the Royal Agricultural Society. The number of specimens similarly forwarded in 1899 was 380, and in the preceding year 327. The diseased parts and organs sent for examination represented a great variety of morbid conditions, but a large proportion was furnished by the bacterial diseases. In many cases microscopic examination and cultural and inoculation experiments were required to determine the nature of the disease, and by such means the cause of many obscure cases has been cleared up.

In addition to the experiments forming part of the series instigated by the Tuberculin Sub-Committee of the Society (see the Society's Journal for 1900, p. 708) a number of special experimental investigations intended to throw light on problems in pathology or therapeutics have been carried out. The results of some of these will be referred to later on in this report.

ANTHRAX.

The published returns of the Board of Agriculture show that during the year 1900 577 outbreaks of this disease were reported. Judged in this way, the disease was rather more prevalent than during the preceding year, in which the outbreaks numbered 534; but, on the other hand, the number of animals actually attacked was less in 1900 than in 1899, the respective figures being 952 and 986. It will be observed that in each of these two years the average number of animals attacked in an outbreak was less than two, and the fact may be taken as evidence of the beneficial effect of the regulations which are now enforced against this disease.

Anthrax is not a contagious disease in the ordinary sense of the word, but in the absence of certain precautions it may within a very short space of time attack a large number of animals and appear to spread by contagion. Although the average number of animals attacked in outbreaks in this country is less than two, in occasional cases the number is very much higher, and with rare exceptions these more serious outbreaks are the result of ignorance or carelessness in dealing with the first case.

The cause of anthrax is a microscopic germ, the anthrax bacillus, which multiplies in the bodies of infected animals, chiefly in the blood stream. An animal that is the subject of anthrax is to some extent dangerous to its fellows in the same building or field while it is still alive, because of the germs which are apt to be passed out with the excrement or urine; but it may become an infinitely greater source of danger after death if, without any precautions in the way of disinfection, the carcass is skinned or dressed. As a rule, every drop of blood in an animal dead of anthrax swarms with anthrax bacilli; and to skin or dress an anthrax carcass means the liberation of countless numbers of these germs, with the possibility that they may infect the hands of those who conduct the operation, or give rise to further cases of anthrax in animals by being taken in with food or water.

These considerations show the necessity for isolating animals suspected of anthrax, and for great care in disposing of the carcasses of animals dead of the disease. The sole duty of the agriculturist when he suspects the existence of anthrax among his animals is to give information to the police, and if the suspicion is verified the officers of the local authority will take over the duty of disposing of the carcass in the proper manner. On no account should animals suspected of anthrax be bled, and the carcasses of such animals should not be skinned or mutilated in any way.

The necessity for these precautions has often been insisted upon in previous reports, and the Society has issued a leaflet with the object of giving the fullest publicity to them.[1] Nevertheless many reports of gross neglect of such precautions continue to reach the Laboratory. One of the most frequent examples of such neglect is the feeding of pigs with the flesh of cattle or sheep that have been unexpectedly found dead. This is a double offence—first, because it generally involves the skinning of the carcass, with consequent risk to the person who does it, and serious contamination of the ground; and secondly, because it is a very certain method of infecting with anthrax the pigs so fed. It cannot be too strongly impressed upon farmers that animals, particularly cattle, that are unexpectedly found dead, or which die after a very brief illness of which no cause is apparent, ought to be suspected of anthrax; and unless it is known that the cause of death was not anthrax, raw flesh ought not to be used for feeding pigs.

Inquiries which were made during the past year have proved that in many parts of the country the feeding of pigs with the raw and often putrid flesh of cattle, sheep or horses that have died from disease is a comparatively common practice. Apart from the revolting aspect of such a diet for animals intended for human food, the habit deserves to be strongly condemned owing to the fact that it lends itself to the dissemination of disease.

What has been said above makes it evident that, given one case of anthrax in a herd or flock, the disease may easily spread to a large number of animals: but it does not explain the origin of the first case in an outbreak.

As a matter of fact, this point is scarcely ever cleared up in the case of outbreaks occurring among animals at pasture, though it is highly probable that the starting-point of most such outbreaks is some spot of ground remaining contaminated from the blood or excretions of a previous case of the disease, which may have occurred years before. When blood or other material containing anthrax bacilli is spread on the surface of the ground, the germs may soon perish from the effect of sunlight and other circumstances unfavourable to their growth ; but in certain favourable conditions of temperature and moisture the bacilli resolve themselves into spores, and these constitute the most serious form of soil contamination. Such spores, like the seeds of a plant, may resist all vicissitudes of climate and remain in a state of dormant vitality until, when accidentally taken in by an animal with food or water, they set up a new case of the disease.

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[1] Copies of this leaflet may be had, free of charge, on application to the Secretary of the Society at 13, Hanover Square, London, W.

Although it is thus probable that in most outbreaks of anthrax the cause is local, it is certain that in some outbreaks the cause is extraneous or imported. This is probably always the case in the occasional outbreaks of anthrax which occur among animals kept in towns and fed exclusively on dry forage. In a former report reference was made to an outbreak of this kind in a London stable. In that case it was proved experimentally that the infection was conveyed by means of the foreign oats on which the horses were being fed, and the owner of the horses thus infected obtained damages from the seller of the oats. During the past year several samples of cake and oats were sent to the Laboratory to be tested in consequence of a suspicion that the materials in question had caused anthrax among animals fed therewith. Although in all these cases it was reported that the circumstantial evidence pointed very strongly to the presence of anthrax germs in the cake or oats, the experimental tests gave negative results in all but one case. In that instance it was ascertained that anthrax germs were undoubtedly present in the sample of oil-cake sent for examination.

It is not improbable that this is a more frequent cause of anthrax in this country than has hitherto been supposed. At any rate, it is a possible cause that ought not to be lost sight of when an outbreak of the disease occurs among stall-fed animals of which cake forms part of the diet, and especially in those cases in which there is no history of a previous attack of anthrax on the same premises or farm.

GLANDERS.

An unsatisfactory feature of the returns of the Board of Agriculture regarding the occurrence of the contagious diseases of animals during the past year is a very considerable increase in the prevalence of glanders which they disclose. The number of outbreaks reported during the twelve months was 1,126, and the number of horses attacked 1,865, while the figures for the preceding year were 853 and 1,472 respectively.

It was hoped that with the discovery of mallein, the immense value of which as a diagnostic agent is now universally admitted, marked progress towards the extermination of the disease would soon be made. This expectation has not been realised, and the explanation is not difficult to find.

At present the law does not regard a horse as glandered unless outward or clinical signs of the disease are present, and in the administration of the Glanders Order a quite unusual interpretation is given to the word "suspected." For example, in the case of pleuro-pneumonia or swine fever the word "suspected" covers all animals that are known to have been recently exposed to the contagion of these diseases; but in dealing with outbreaks of glanders the practice of most local authorities is to consider "suspected" only such horses as present doubtful external symptoms of glanders. As soon as these and the obviously glandered animals have been destroyed and the premises have been disinfected, the outbreak is considered to be at an end, and no restrictions are placed on the movements of outwardly healthy-looking horses, although it is known that they have been exposed to the contagion of glanders. The result is that such horses are freely sold, and that the disease is thereby carried into new stables. It is even possible that at the present time the confidence which is placed in mallein is contributing to the spread of the disease, unscrupulous owners applying the test to their apparently healthy horses, and promptly disposing of those that react. To counteract this state of affairs some amendment of the law is urgently required.

It is true that in the present distribution of the disease glanders is not of great practical interest to the agriculturist, since in the main it is a disease of town horses. At the same time, however, the extension of the disease cannot be viewed with indifference by farmers, for as long as it is a common disease in the large cities there is considerable risk of the infection being carried into country places. A number of the horses annually "cast" from the large railway, omnibus, and tramway studs find their way back into the country to work on the land, and it cannot be too well known that whoever buys such a horse takes considerable risk of importing glanders. Where the circumstances justify any suspicion of that kind, the newly-purchased animal ought to be tested with mallein before he is put in association with other horses.

FOOT-AND-MOUTH DISEASE.

After five complete years (1895–99) of freedom from foot-and-mouth disease, this dreaded plague appeared in the British Islands in the early part of the past year, and although, fortunately, it has not yet attained to serious dimensions, the contagion has been carried over a large part of England, and has defied the efforts of the Board of Agriculture to stamp it out. The present invasion of the disease is unlike any of the previous visitations in the matter of the number of outbreaks in relation to the time over which they have beeen spread. The long period from 1839 to 1886 covered the duration of what may be called the first visitation, though there is some reason to believe that the country was free from the disease for a few months at the close of 1879, and that the outbreaks of 1880 were started by importation of diseased animals from abroad. The number of animals affected during this first visitation was probably not far short of seven millions, and in one year alone (1871) the officially reported outbreaks were over 5,000 and the number of animals attacked over half a million.

In 1886 only one outbreak of the disease was detected, this representing the last spark of the conflagration which was lighted in 1839. From 1887 to 1891 inclusive the country was entirely free from the disease, and the second visitation began in February 1892, when the disease was detected among foreign cattle exposed in the Metropolitan Cattle Market. In spite of all the efforts made to check the spread of the infection, the disease soon appeared in many places widely apart, but it was apparently eradicated by the month of June, after nearly 5,000 animals, in 95 separate outbreaks, had been attacked.

The third invasion comprised two outbreaks in 1893, one of which was detected in a London cowshed on January 1, and the other near Hastings on February 17. As in the case of the subsequent invasions, the source of the outbreaks of 1893 was not traced, but it had to be set down to mediate contagion from abroad, since the importation of foreign animals, save for slaughter at the port of landing, came to an end in 1892.

In 1894 the disease reappeared in the same mysterious manner, but this, the fourth, visitation comprised but three outbreaks, and involved only 268 animals.

After five years of freedom from the disease, the fifth invasion was started with an outbreak which was detected in Suffolk during the latter part of January 1900. The second outbreak occurred in Norfolk in February, and during the same month the disease was detected in Bedfordshire. A month later it reappeared in Norfolk, and in May it was detected in Hertfordshire. No fresh outbreaks were reported in June or July, and it was hoped that the disease had been stamped out, but in August it cropped up again at places as far apart as the East Riding of Yorkshire and Flintshire in North Wales. In September it was detected in Wiltshire, and in October in Staffordshire. Again there was an interval of two months without any fresh outbreaks, but in December an outbreak was discovered in Essex, and at the date of writing the disease has been carried over into the new year by an outbreak in Suffolk.

The returns published during the last week of 1900 show that the total number of outbreaks detected during the year was 21, with 266 animals attacked. As already said, no previous visitation has had such long intervals between the separate outbreaks, and it is natural to search for some explanation of the erratic course of the disease during the past year.

It is impossible to doubt that this invasion, like those of 1893 and 1894, was started by germs of the disease imported from abroad through the agency of some intermediary bearer. The facility with which the disease may be spread in this way is well recognised in veterinary literature and attested by many striking examples. The opportunities for the carriage of infective materials provided by the daily traffic with parts of the Continent in which foot-and-mouth disease has for some time been rampant make the view that it was imported into this country in January 1900 perfectly plausible: nor is it surprising that the investigations carried out by the Board of Agriculture failed to trace the primary source of the contagion.

The same can, however, hardly be said of the mystery which hangs over the twenty separate outbreaks which occurred between February and December, 1900. It is not credible that each of these was due to separate importations of the virus from abroad, and although no connection between the successive outbreaks has been traced it is almost certain that such a connection existed.[1] The probability is that the recorded outbreaks of last year form part of a continuous chain of which a good many of the links have never come under the notice of the Board of Agriculture. That a considerable number of outbreaks have not been reported or officially discovered may be set down in part to ignorance of the symptoms of the disease on the part of stockowners, but it is to be feared that wilful concealment of the disease is part of the explanation. More vigilant inspection and the infliction of the fullest penalties allowed by the law on convicted offenders are the only remedies for wilful concealment, and an endeavour to counteract the other source of difficulty in following up the disease must be made by diffusing among farmers and others a better knowledge of the symptoms of foot-and-mouth disease. Fortunately these are very characteristic.

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[1] A letter received by an English correspondent from Professor Bang, of Copenhagen, is interesting on account of the parallel it suggests between the condition of matters relating to foot-and-mouth disease in this country and in Denmark. The following is a summary of Professor Bang's communication:—

"Referring to the early history of the disease, Dr. Bang states that from 1869 to 1871 foot-and-mouth disease was prevalent in various parts of Denmark; then it existed to a slight extent in 1875, 1876, and 1878. On the subsidence of these outbreaks the country remained free until October, 1892, when the disease again appeared, and continued until September, 1893. About 400 outbreaks occurred on separate farms. Up to this time slaughter was not generally adopted. The endeavour to trace the outbreaks failed in each case.

"It was known that the disease was prevalent in Germany during the time, but no animals were imported from Germany, nor, as a rule, was fodder from Germany imported. There is, however, a record of one outbreak that occurred at a considerable distance from the German frontier, and it was ascertained that the practice was to bring German fodder on to that particular farm. It was also known that German traders very commonly visited the herds in Denmark in the ordinary course of their business.

"Dr. Bang remarks that very often foot-and-mouth disease appeared at points distant from each other without any apparent communication between the places, 'as in England just now.'

"In the course of his inquiry Dr. Bang was led to suspect the railways, and he remarks that careful disinfection of the railway trucks seemed to be of some use. Since 1896 foot-and-mouth disease has appeared in the country occasionally—once or twice a year—but, after a most careful inquiry, they have never been able to trace the source of the outbreaks. Latterly the policy of slaughter has been rigidly carried into effect: even in the event of a single calf being attacked with the disease, the whole of the cattle, sheep, and swine on the premises have been at once slaughtered.

"Dr. Bang suggests, at the conclusion of his communication, as a possible cause of the introduction of the disease, that birds might fairly be suspected, as they could easily carry the infection on their feet from one place to another."

The first symptoms generally appear within a week after the exposure to infection. In *Cattle* these are slight dulness, shivering, loss of appetite, "staring of the coat," and stiffness in movement. Even at this time the animal is in a state of fever, the temperature being generally two or three degrees above the normal. Within a few hours these premonitory symptoms of illness are followed by others which are characteristic of the disease. The animal ceases to feed, and is reluctant to move. From time to time it makes a peculiar smacking noise with its lips, from which more or less frothy saliva escapes. If the mouth be opened, white blister-like elevations will now be found on some part of the lining membrane of the mouth, and these soon burst and leave shallow raw sores or ulcers. When made to move, the animal is obviously lame or "tender on its feet"; and while standing it frequently shifts the weight from one leg to the other, and shakes its feet, as if to get rid of something adhering to them. This tenderness of the feet is well marked even before the formation of blisters on them; but these soon appear on the skin between the claws or behind them, immediately above the horn.

When the vesicles have burst the animal suffers increased pain in the mouth, and it neither eats nor chews the cud; and owing to its inability to swallow without great pain the saliva is allowed to trickle from the mouth. The general appearance of the animal at this stage is indicative of great misery: the eyes are dull, the ears drooping, the back arched, and the hair erect and without lustre. The bowels are generally more or less constipated, and in milch cows the secretion of milk is greatly diminished or almost arrested.

As a rule there is little or no improvement in the animal's condition for about a week, during which time it rapidly loses flesh. At the end of that time the fever begins to subside, and although the sores in the mouth have not yet healed the pangs of hunger compel the animal to attempt to eat, especially if grass or other soft food is to be had. The tenderness of the feet gradually declines also, and in most cases all the visible symptoms of the disease have disappeared within ten or fourteen days after the onset.

The symptoms in *Sheep* are generally somewhat different from those just described, inasmuch as in them the mouth often escapes attack, or is only slightly affected. On the other hand, in sheep the disease always attacks the feet, and the lameness is severe. The pain in the feet is so great that the animal is unable to gather its food; and it lies persistently, with consequent rapid loss of condition.

Pigs are affected in much the same way as sheep: there is always pronounced lameness or tenderness of the feet; and although blisters may form on the snout or in the mouth, they are not so constant in that position as in cattle.

As has already been said, these symptoms are very characteristic, but it would not be correct to say that the diagnosis of foot-and-mouth disease never presents any difficulty. It may, however, be said with truth that there is never any difficulty in recognising the disease when any considerable number of animals are simultaneously affected—at least, in the case of cattle. The markedly contagious character of the disease is a point of great importance in diagnosis, as is also the fact of its affecting simultaneously both cattle and sheep. Conversely, no matter how closely the symptoms presented by a single animal may resemble those described above, the disease may be set down as *not* foot-and-mouth disease when, in spite of abundant opportunities for infection, it does not spread after a few days to other cattle or sheep. Doubts are only justified when, as in the case of a single diseased animal seized in a market, there is no evidence that the condition is contagious. Even then, of course, it is wise to provisionally diagnose the affection as foot-and-mouth disease, and not to wait for evidence of the disease being contagious before taking the steps which the law directs. It is hardly necessary to observe that the duty of determining whether a given animal is the subject of foot-and-mouth disease or not is not laid upon the stockowner. Whenever there are any reasonable grounds for suspicion, and the owner is not certain that the symptoms exhibited by any of his animals are not those of foot-and-mouth disease, his duty under the law is to give immediate notice to a constable of the local police force.

Although it is in the highest degree desirable that such intimation should be given with all practicable speed by the owner of any animal which presents such symptoms as those previously described, leaving the responsibility of making an exact diagnosis to the veterinary inspector of the local authority, it is not necessary or desirable that the owner should report every case of disease affecting the mouths or feet of his animals as suspected foot-and-mouth disease. In cattle the combination of soreness of the mouth and lameness ought always to be reported, for there is no other disease of the ox species in which that combination is present.

Diseases of Sheep Simulating Foot-and-Mouth Disease.

As already stated, foot-and-mouth disease in the sheep often affects the feet only, and there are three other diseases of that species in which lesions are present in connection with the mouth or feet. The first of these is foot-rot. That disease is undoubtedly contagious, but it never spreads with anything like the rapidity of foot-and-mouth disease, and it never extends to cattle pastured with the affected sheep. A further distinction is that foot-rot is primarily a disease of the horn of the claws, and its effects are most marked on the part of the foot which comes into contact with the ground: whereas in foot-and-mouth disease the foot is first attacked at the top of the claw, and generally towards the heel, where some degree of separation between the horn and the sensitive structures is soon produced. Again, in foot-and-mouth disease the sheep is generally lame or tender in the whole of its feet, while in foot-rot the disease may for a long time be confined to one foot.

The second disease of the sheep which has some resemblance to foot-and-mouth disease in respect of the situation of the lesions is the one which is known as malignant aphtha. The resemblance is certainly not at all close, and even laymen need experience no difficulty in distinguishing between them. Malignant aphtha does not attack the feet, and it is usually met with as a troublesome affection of ewes and young lambs. In the case of the lambs the disease is manifested by the formation of sores on the nose or lips, and the ewes develop similar sores on the teats and udder. In neither case are the sores ever blister-like: they are generally covered by brownish crusts or scabs, and in the lambs they do not form in the interior of the mouth, but on the outside of the lips or around the nostrils. The disease apparently is only spread by direct application of matter from the sores to the skin, and it is rarely seen affecting lambs more than a few weeks old.

The third disease of sheep which has been mistaken for foot-and-mouth disease is one that has not received much attention in veterinary literature, although it is not of very rare occurrence. It is the one which led to a mistaken declaration of the existence of foot-and-mouth disease in Perthshire in the month of September last. In Scotland it has long been familiar to many shepherds, and it has various local designations, the commonest of which is perhaps "orf." It attacks lambs of any age up to a year old, and it is rarely seen in adult sheep. The sores which characterise it are not unlike those of aphtha, and the parts on which they usually form are the face and the legs. On the face the lesions are present on the skin around the nostrils and on the hairy surface of the lips—never in the interior of the mouth. On the legs the sores may form anywhere between the top of the hoof and the knee, or even higher, and sometimes the sensitive structures around the top of the claws are also involved, with more or less lameness as a consequence. The disease has never been known to spread to cattle or other animals than sheep.

It has been thought well to give this outline account of the diseases which may be, and some of which actually have been, mistaken for foot-and-mouth disease; but the best advice to the layman with regard to the differential diagnosis of affections of the mouths and feet of cattle or sheep is to free himself from all responsibility by reporting to the authorities every such condition about which he feels any doubt. It is much better that the Board of Agriculture should receive twenty false alarms than that a single genuine outbreak of foot-and-mouth disease should remain unreported for even a day after its discovery.

SWINE FEVER.

During the past year the total number of outbreaks of this disease dealt with by the Board of Agriculture was 1,940. This represents a decrease of 382 outbreaks as compared with the previous year, but it is only 215 less than in 1897. The present state of affairs is no doubt an improvement on that which existed before the disease was taken in hand by the central authority; but the comparatively slight impression made on the disease during the last three years is somewhat disappointing, since it does not appear to justify much hope that it will ever be exterminated by the present methods of dealing with it. A notable feature of the returns is the smaller average number of pigs slaughtered in each outbreak as diseased or exposed to infection as compared with previous years. The average number thus destroyed in each outbreak during the past year was 9, while in 1897 it was 18. This can hardly be explained otherwise than by supposing that the circumstances which constitute "exposure to infection" are now judged more leniently than they were a few years ago.

RABIES.

It appears probable that the year 1900 will remain memorable as the one in which rabies was eradicated from Great Britain.[1] As a matter of fact, no case of the disease was detected in England or Scotland during the twelve months, and the only cases reported during the year were in Wales. The total number of dogs attacked was six, but five other animals were destroyed in consequence of having been bitten by rabid dogs. No case of the disease has been detected in dogs since the second week of October, 1900.

DISEASES CAUSED BY ANIMAL PARASITES.

Parasitic Gastritis in Cattle and Sheep.—Former reports have contained references to the very serious losses caused among both cattle and sheep by minute, almost microscopic, worms which inhabit the fourth or true digestive stomach of these animals. Judged by the number of specimens forwarded to the Research Laboratory, this form of disease has been less prevalent among sheep and lambs in 1900 than in some recent years. It is not improbable, however, that the smaller number of such cases that came under notice during the past year is mainly due to the fact that, as an outcome of the investigations which were carried out a few years ago, the disease is now much better known both to farmers and to practising veterinary surgeons, with the result that a correct diagnosis is more frequently made without having recourse to the Laboratory. During the year a number of new examples of the mischief which these stomach-worms cause in cattle came under notice, and advantage of the opportunities thus presented was taken to carry out some further experiments with regard to treatment.

During the year three cows from three different farms on which this disease was found to exist were brought to the Royal Veterinary College. All of these at the time of their admission were at a rather advanced stage of the disease, and the drug which was selected for experimental trial on them was thymol, as within the last few years it has acquired considerable reputation as a remedy against round worms located in the intestines. Unfortunately, it has to be confessed that it entirely failed to produce any favourable effect on the course of the disease in any of the three animals, the condition of which steadily advanced from bad to worse. One of them had to be destroyed owing to weakness and emaciation, and the other two, though still alive at the time of writing, are much worse in appearance than when they were first put under treatment. The maximum quantity of thymol administered to one animal was 2½ ounces, this being given in five equal doses spread over a period of 25 days. It is doubtful whether much larger doses could be given with safety.

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[1] One outbreak of this disease in Wales was reported in April 1901; but the last of the Muzzling Orders, applying to Breconshire, Carmarthenshire and Glamorganshire, were finally revoked as from December 16, 1901.

As has been pointed out on former occasions, the great difficulty of effecting a cure in this disease lies in the fact that it is scarcely possible to insure that any medicine administered by the mouth shall reach the fourth stomach in such a degree of concentration as will prove fatal to the worms there. The same remark applies to the treatment of parasitic enteritis in the horse. One may administer a medicinal substance in quantities approaching the fatal dose, and in such a degree of concentration as to insure the immediate death of any worm immersed in it; but by the time the drug reaches the fourth stomach in the case of ruminants, or the large intestine of the horse, it may have become diluted or absorbed to such an extent as to render it quite innocuous to the parasites which it is intended to kill. In this connection it may be mentioned that the favourable results which have been claimed for thymol in the treatment of parasitic inflammation of the intestine in colts have not been borne out by some experiments which were made with it during the spring of last year, although it was given in much larger doses (half-ounce) than those generally recommended.

There is reason to think that parasitic gastritis in cattle is still pretty frequently mistaken for tuberculosis during life, though such a confusion is not possible if the body is opened after death. Experience justifies the statement that in cattle the most frequent cause of persistent diarrhœa, with steady loss of condition in spite of unimpaired appetite, and without cough or other evidence of lung disease, is the presence of worms in the stomach. Diarrhœa is far from being a constant symptom in tuberculosis, even at advanced stages of the disease; and before it sets in there is generally distinct evidence of lung disease, and the appetite is much impaired. After death a mistake is not possible, for the post-mortem examination of an animal which has died from tuberculosis, or which has been obviously ill from that disease before it was killed, always reveals very gross signs of disease in the internal organs, usually in both chest and abdomen. On the other hand, at the post-mortem examination of animals that have died from parasitic inflammation of the stomach, the whole of the internal organs, with the exception of the fourth stomach, are generally quite normal in appearance, and even the stomach might pass for healthy to casual inspection.

In the absence of any known means of curing this disease, preventive measures acquire great importance. The chief of these are isolation of suspected animals indoors, to prevent further contamination of the soil with the eggs and young worms, and destruction of their manure.

Œstrus Disease in Sheep.—There does not appear to be any popular name for this disease, probably because it is, fortunately, not of very common occurrence in this country. It is caused by the larvæ of a species of gadfly—the *Œstrus ovis*—which inhabit the so-called air sinuses of the head and also the horn-cores in horned breeds. The flies attain maturity about midsummer, and in the months of July and August the females deposit their eggs—or, as some suppose, the already hatched larvæ—about the nostrils of the sheep. The minute larvæ make their way up the nasal cavities, from which they pass into the air-sinuses and the horn-cores, to attach themselves to the membrane lining these cavities. There they remain till the following spring, and they then migrate back into the nasal cavities on their way to the exterior, their outward passage being assisted by the sneezing efforts provoked by the irritation of the mucous membrane. The larvæ on reaching the soil speedily pass into the rigid motionless "nymph" stage, from which after six or eight weeks the fully formed fly escapes.

As a rule the larvæ do not give rise to any symptoms until they begin their migration from the air-sinuses back into the nose, which in this country usually occurs about the month of May, and even then they do not occasion any noticeable disturbance unless they are numerous.

During the past year very serious losses among sheep were caused by this parasite in Wales, and a number of examples of its effects were forwarded to the Laboratory by Mr. W. Williams, M.R.C.V.S., Llandilo. The principal symptoms exhibited were as follows: Bloodshot staring eyes, elevation of the head, staggering gait, a discharge of matter from the nose, sneezing, and coughing. Great numbers of sheep died, and many others were killed owing to their apparently hopeless condition. In those cases in which death has been produced the fatal effects have generally been attributed to the intense irritation of the lining membrane of the nose and sinuses which the larvæ occasion. But it was observed that in the specimens sent from Wales these nasal lesions were accompanied by more or less extensive pneumonia, and it is not improbable that the latter condition was the main factor in determining death. In one case a considerable number of the larvæ had migrated into the windpipe; but, apart from such a cause of lung complications, the entrance into the air tubes of purulent matter from the nasal cavities would probably be sufficient to account for the pneumonia.

Recommendations with regard to the treatment and prevention of this disease are not lacking in veterinary text-books, but it must be confessed that some of them are counsels of perfection, and the others are of very doubtful value. To the former class belongs the advice to keep the sheep away from the neighbourhood of woods and plantations which are specially frequented by the gadfly, and to destroy the larvæ after they have been expelled from the noses of affected sheep. The smearing around the nostrils of the sheep of tar and other substances supposed to be distasteful to the flies is not altogether impracticable, but there is no reliable evidence that the insects can be deterred from depositing their eggs or larvæ by such means. Dishorning or opening of the sinuses of the head by surgical operation has also been suggested, in order to remove the larvæ or to destroy them by introducing substances fatal to them;

but in the present state of knowledge probably the best plan as soon as the disease is recognised is to make mutton of all the affected animals which are in fair condition. As already mentioned, the disease is not very common in this country, but it is said that in the district in Wales in which so many deaths occurred last May a similar outbreak took place about twenty years ago.

FOWL CHOLERA.

Fowl cholera has long been known on the continent of Europe as a dreaded scourge of the poultry-yard. Historically it is of great interest, because it was one of the first diseases proved to be caused by bacteria, and because Pasteur's researches in connection with it conducted him to a discovery which may be said to have formed the foundation of the method of protective inoculation by means of artificial cultures.

The organism which is the cause of the disease is called the bacterium or bacillus of fowl cholera, and it is so minute that it appears as a mere point, just visible to the eye, when it is magnified 500 times. To appreciate its exact form at least double that magnification is necessary. In a bird dead from fowl cholera the blood everywhere swarms with these bacteria, for it is mainly in that fluid that the germ multiplies when it gains access to the body. The bacteria, however, are not confined to the blood, for they are always present in great numbers in the intestines of diseased fowls.

As the name indicates, profuse diarrhœa is one of the most constant and prominent symptoms of the disease, and countless numbers of the bacteria are voided with the thin excrement passed by the affected birds. It is mainly or entirely by means of such excrement that the disease is spread, and in view of the circumstances in which fowls are generally kept, and their habits of feeding, it is not surprising that the disease often causes terrible ravages when once it has obtained a footing in a poultry-yard.

English veterinary literature does not contain any authenticated case of the occurrence of fowl cholera in this country, and, probably on this ground, an eminent bacteriologist has even asserted that the disease does not occur in Great Britain. That, however, is an error, and since the foundation of the Research Laboratory at the Royal Veterinary College a considerable number of genuine outbreaks of fowl cholera have been investigated there. During the past year two such outbreaks came under notice. The two outbreaks occurred almost simultaneously on two farms several miles apart, and it was not apparent that there had been any opportunity for the carriage of infection from one farm to the other. The only discoverable circumstance that could be held to have any possible bearing on the origin of the outbreaks was that at both farms the poultry were being fed with corn sweepings from foreign ships that discharged at a neighbouring port.

In these two cases, as in all the others that have come under notice at the Laboratory, it was suspected that the fowls were being poisoned, but microscopic examination of the blood, which is a routine practice in such cases, left no room for doubt that the cause of death was fowl cholera. In each case the blood was found to be swarming with minute organisms having the size and shape of the bacteria of that disease, and artificial media inoculated with a trace of blood yielded cultures with the characters that belong to the germ of fowl cholera. Furthermore, experiments showed that these artificial cultures were capable of killing fowls within forty-eight hours after inoculation, the blood of such fowls swarming with the bacteria, just as in natural cases of the disease.

The discovery by Pasteur to which allusion has been made above was that artificial cultures of the fowl cholera bacterium may be successfully employed to vaccinate fowls against the natural disease. Inoculation with cultures that have only been grown for a few days has just the same effect as inoculation with a drop of blood from a bird dead of fowl cholera; that is to say, it sets up a fatal attack of the disease. On the other hand, if the incubation of the artificial culture is continued, with free exposure to the air, the bacteria gradually lose their virulence, and become "attenuated," and such attenuated cultures may be employed to confer on fowls a valuable degree of immunity against the disease. Although the feasibility of this method is well established, it has never been put into practice on a large scale. In the first place, the expense of the vaccin and of the operation is a barrier to the method in dealing with animals of such small value as fowls; and, in the second place, before the disease has been correctly diagnosed it has often made such headway that the majority of the fowls on the premises are either dead or infected.

Although the origin of the first case of fowl cholera cannot always be determined, there are outbreaks in which the mischief can be clearly traced to some newly purchased fowl, which suggests that, just as in the case of the larger animals of the farm, it is well to place newly bought poultry under quarantine for a few days.

The chief symptoms of fowl cholera are great dulness, loss of appetite, separation from the rest of the poultry, livid discoloration of the comb, drooping of the wings, ruffling of the feathers, and diarrhœa. When such symptoms are exhibited by a number of fowls, or when a number of fowls die suddenly, even if these symptoms have not been noticed, it is well to suspect fowl cholera. As soon as the disease has been diagnosed, every ailing fowl ought to be destroyed, and the survivors ought if possible to be removed to fresh premises while the old ones are thoroughly cleansed and disinfected. If the weather permits, the best plan is to keep the fowls in the open, and to feed them on a fresh plot of ground every day. In short, the measures to be taken are those that are dictated by a knowledge of the fact that the disease is spread by food or water soiled with the excrement of the affected birds.

J. McFadyean.

Royal Veterinary College, Londor, N.W.

ANNUAL REPORT FOR 1901 OF THE CONSULTING CHEMIST.

DURING the past year (December 1, 1900, to November 30, 1901), 682 samples have been sent by members of the Society for analysis, as against 660 samples sent in the twelve months of 1900.

In the kinds and relative numbers of materials examined, there has been little change beyond a diminution in linseed cakes and an increase in decorticated cotton cakes. Hardly any fresh material, either for feeding or manurial use, has been brought into notice, but there has been one new form of adulteration introduced—that of decorticated cotton cake—which calls for special comment.

Prices for linseed cake have ruled high throughout the year, at no time going below 7*l.* 10*s.* per ton for good qualities, while 8*l.* 5*s.* to 8*l.* 10*s.* per ton was frequently the price. Undecorticated cotton cake has been generally quoted at from 4*l.* 12*s.* 6*d.* to 5*l.* and 5*l.* 5*s.* per ton, while decorticated cotton cake has varied from 6*l.* 10*s.* to 6*l.* 15*s.* per ton.

In compound cakes, of which, as a class, I have frequently had occasion to speak not very favourably, there has been a decided improvement, and I think that there has been, on the part of makers, more desire to avoid the use of doubtful ingredients, and, on the part of buyers, more disposition to inquire into the nature of the manufacture and products.

In the case of manures there has been, as of late years, very little to complain of. Farmers have been able to get good manures very readily, and not at all dearly, and this branch of the trade is certainly, as regards the supply to the farmer at least, in a satisfactory state.

I proceed to comment briefly, under their respective headings, on the principal matters brought out by the examination of the samples submitted to me, the full list of these being given at the close of my report.

A. FEEDING STUFFS.

1. *Linseed Cake.*

The quality and purity of this have, as a rule, been satisfactory, and in both these directions improvement has been shown. This has, however, I feel sure, been largely due to farmers becoming more alive to the advice and warnings which have been issued by the Society. Of the 72 samples of linseed cake analysed, two-fifths have shown 11 per cent. or more of oil, while only one-sixth have fallen below 9 per cent. of oil. A very good and cheap cake was the following one marked A :—

	A	B
Moisture	10·50	12·35
Oil	11·50	5·25
[1] Albuminous compounds	32·68	35·79
Mucilage, digestible fibre, &c.	32·14	34·05
Woody fibre	6·73	7·08
Mineral matter (ash)	6·45	5·48
	100·00	100·00
[1] Containing nitrogen	5·23	5·73

This was quite pure, and cost, in the neighbourhood of Alnwick, Northumberland, in July 1901, 7*l.* 7*s.* 6*d.* per ton.

By way of contrast is put, side by side, the analysis of a very different cake (B). This was stated to have been purchased from a very good firm in Dublin, and to be sold as "Canadian." It was of a very light colour and, from the appearance and analysis, I should judge it to have been made from linseed meal partly exhausted (by chemical means) of its oil previously to being pressed into cake.

As usual, there have been cases affording useful warnings. In one of these a member of the Society sent me a sample of linseed cake which, on analysis, gave :—

	Per cent.
Oil	7·53
Sand	2·00

My report was to the effect that the cake was hard-pressed and poor in oil, and that, though free from weed seeds, it had excessive sand. The vendors, while expressing themselves willing to meet the purchaser by giving him an allowance, sent him, by way of explanation, copies of analyses of cakes which they had been supplying to their customers. Finding that one of these analyses had been made by myself, and that it showed Oil 11·23 per cent., I had the curiosity to look the matter up, and discovered that the analysis had been made two and a half years previously. Such a testimony as bearing on the quality of cake supplied at the present time has obviously no value. Purchasers must insist upon guarantees for the particular supply sent to them, and not depend on previous analyses set out, unless these are actually guaranteed at the time of purchase.

Of cases of impurity or adulteration the following are the chief :—

a. A linseed cake, sold at 8*l.* 17*s.* 6*d.* per ton, contained 1·79 per cent. of sand, and had in it a considerable amount of weed seeds, chiefly rape, together with starchy impurities. The vendors, who were only local retailers, in giving an allowance of 22*s.* 6*d.* per ton, stated that the cakes were made for them by a firm in the North of England, whose explanation of the impurity was that "the men allowed the bins to run too low, and this particular lot has got all the admixture which collects on the bottom of the bins after a night's work." As I pointed out, however, while this might account for the sand present, it would hardly account for the rape and other weed seeds found.

b. A linseed cake, offered at 9*l.* per ton as "pure," was found to contain sand 3·72 per cent. The analysis having fortunately been made before the purchase was completed, the latter was not effected.

c. The following case shows the need of care in seeing that an invoice is set out so as to give, beyond any doubt, a clear guarantee of purity. A sample of a purchase of linseed cake, invoiced as "2 tons L. Cake at 8*l.* 7*s.* 6*d.*" was found to contain a great many weed seeds, among these being rape, mustard, *Polygonum*, *Chenopodium*, and corn-cockle. The vendors had put in small type in one corner of their invoice the following note: "Fertilisers and Feeding Stuffs Act, 1893.—We hereby declare that all feeding stuffs invoiced upon this invoice not therein specially described as Pure, are prepared from more than one substance or seed." "L. Cake," of course, may be taken to mean "Linseed Cake," and the use of the term "Linseed" implies that the cake must be "pure," *i.e.* made from one substance or seed only. But it might be held that the notice on the invoice as quoted above removed the liability. In all cases it behoves the purchaser to see that the cake is clearly described on the invoice as "Linseed cake," and without any qualifying words or notices.

2. *Undecorticated Cotton Cake.*

Woolly Cotton Cake.—Comparatively few complaints have occurred of cake being woolly and objectionable through the seed not having been properly cleaned. I am informed, however, that the rough, uncleaned cotton seed, with a quantity of wool still adhering, and which, for that reason no doubt, is rejected for cake-making, is sold by itself as a food for stock. I have myself seen this seed eaten freely by bullocks in India, but it has to be remembered that these hardy animals thrive on very different fare, are always used for work, and live under conditions so very different from those of our fattening bullocks at home, that the analogy of feeding does not hold good, and I would not advise our farmers to try the risky experiment of imitating the food diets of India for their cattle at home.

Another instructive case was the following: A purchase of cake under the description of "Egyptian Cotton Cake" had been made of a Liverpool firm at the price of 4*l.* 15*s.* per ton, with carriage 11*s.* 3*d.* per ton additional. I examined a sample and reported, "A very inferior cake, with coarse husk, and woolly." On the purchaser complaining, the vendors disputed my report, and claimed to have the sample submitted to an independent chemist. This was done, and the chemist in question sent the vendors his certificate of analysis, giving his opinion of the cake in a letter accompanying the certificate. The vendors thereupon sent the purchaser the certificate of analysis, but withheld the letter containing the opinion, and maintained that the analysis showed the cake to be of good quality. The opinion was in these terms: "The cake in question contains the husk in a coarse condition, and a considerable quantity of cotton wool." It was only on pressure that the vendors produced the opinion, and offered to make an allowance.

Cotton Cake "Freshened" with Borax.—Some time ago I drew attention to the fictitiously bright appearance sometimes imparted to cotton cake by the addition to the cake, during manufacture, of borax. Other similar cases have again been recently brought to my notice. I consider the use of borax decidedly objectionable. If food is good it does not want any "chemicals" or medicinal agents put with it, and the presence of such I regard as "adulteration." The purchaser does not ask for these, nor does he expect to have them in the food supplied.

3. *Decorticated Cotton Cake.*

I cannot say that the improvement noted in my last report as regards the quality and mechanical condition of this class of cake has been maintained. On the contrary, few good samples have been received, and it would seem that so ready is the sale for this cake that anything of that name is good enough to send over here, and so care is not exercised to get better makes. Of the thirty-seven samples sent me only eight have given over 10 per cent. of oil, and the generality have given only 8 to 9 per cent. The hardness of the cake as imported has induced the larger use of the "made-up" cake, that is, the hard cake ground up and pressed again into cake. Such cake, however, seldom contains above 8 to 9 per cent. of oil.

I met with one instance of a decorticated cotton cake exceptionally high in nitrogen. The analysis gave:—

	Per cent.
Oil	10·82
[1] Albuminous compounds	49 93
[1] Including nitrogen	7·99

The price was 7*l.* 2*s.* 6*d.* per ton, delivered at Cambridge, in March 1901.

Addition of Salt to Cake.—I noticed that a sample of decorticated cotton cake which was sent to me was slightly acid, and that it also had a saline taste. Determining the amount of salt, I returned this as ·63 per cent. Apart from the question of the addition of salt being an adulteration, one naturally looks on the presence of salt with suspicion, it being not infrequently used to cover defects in food not thoroughly sound in itself. On inquiry I found that it had been the habit at the works in question to put in about 3 lb. of salt to every 500 lb. of meal to be pressed into cake.

New Form of Adulterating Decorticated Cotton Cake.—Not satisfied with the ready sale obtained in this country for decorticated cotton cake, it would seem to have struck certain of the less scrupulous makers as being rather a waste to remove the husk when making decorticated cotton cake, and then to throw this husk away. So they have hit on the device of grinding up the husk finely and putting it back into the meal—pressing again into cake, or selling in the form of meal—the description "Decorticated" being still retained, and the current price for decorticated cotton cake or meal being charged. Several instances have come to my notice where cake, called "Decorticated Cotton Cake," but really made up in the way described, has been sold, and which, as the analysis has shown, has been little better than common or undecorticated cotton cake. I have devoted a good deal of time to the unearthing of this fraud, and in two of the instances I was hopeful that a prosecution might be taken up under the "Fertilisers and Feeding Stuffs Act," or possibly under the "Merchandise Marks Act," but either the individuals were too slow in coming forward or the legal machinery was too hard to set in action.

I may here say that to the ordinary eye it is difficult, indeed almost impossible, to distinguish between the genuine decorticated cotton cake and this spurious cake. Occasionally the latter has rather a darker colour. But to the practised eye, and especially after the meal has been washed out with water and the husk left behind, it is clear that the husk is very different in appearance from that of the seed in genuine decorticated cotton cake which has accidentally missed removal. The latter is more or less large in size, of irregular shape, and often has attachments of cotton fibre; but when the husk has been first removed and then ground up again it is very fine in size, regular and angular in shape, and singularly free from cotton fibres. It has, very probably, undergone some cleaning process before being put back in the meal.

In the following samples, the analyses obtained from which I quote and compare with those of genuine cotton cake—both decorticated (E) and undecorticated (F)—I washed out carefully the meal from the husk, weighed and examined the latter, and compared it with that obtained from genuine decorticated cotton cake, and from genuine undecorticated cotton cake, and in each case the differences were very clearly discernible.

"A" represented a purchase of 30 tons sold as "Decorticated Cotton Cake Meal," at 6*l*. 15*s*. per ton, from a firm at Gloucester. The real value of it was about 2*l*. a ton less. The vendors said that the wrong meal had been sent off, and offered an allowance of 5*s*. a ton, which was promptly rejected. Ultimately the case went to arbitration, and the purchaser obtained a reduction of 17*s.* 6*d.* per ton.

	A	B	C	D	Genuine decorticated cotton cake E	Genuine undecorticated cotton cake F
Moisture	10·64	10·04	10·14	8·90	10·64	13·30
Oil	5·46	5·93	6·83	5·99	10·23	5·24
[1] Albuminous compounds	23·87	23·50	28·25	25·00	44·19	23·17
Carbohydrates, digestible fibre, &c.	35·63	36·18	33·24	34·62	23·42	32·27
Woody fibre	20·26	20·16	16·60	20·79	4·88	20·79
Mineral matter (ash)	4·14	4·19	4·94	4·70	6·64	5·23
	100·00	100·00	100 00	100·00	100·00	100·00
[1] Containing nitrogen	3·82	3·76	4·52	4·00	7·07	3·71

"B" was a sample of 1 ton sold as "Decorticated Cotton Cake," at 7*l.* 18*s.* 4*d.* per ton, by a firm in London, who added the description "made in our own mill." This cake was distinctly acid, dark in colour, and the material used in it was not fresh and sound. The purchaser made an allegation against the vendors that the cake had caused the death of some of his cows. The vendors tried to explain the matter away as being due to the fact of whole cotton seed being used by mistake instead of decorticated cotton seed; but, as I pointed out, my examination did not bear this out at all, but showed that decorticated meal with the husk ground up and put back again had been used. The purchaser put the matter into his solicitor's hands, and ultimately the case was settled by payment by the vendors of 60*l.*, to include all costs.

"C" was an instance in which 8 tons had been bought under the name "Pure Soft Decorticated Cotton Cake," at 7*l.* per ton, with the following guarantee:—Oil 10–11 per cent., albuminous compounds 40–42 per cent., carbohydrates 20–22 per cent. The vendor said that he and other firms had been "done" over a cargo of cotton meal, and did not find it out until he had already disposed of some. He fully compensated the purchaser.

"D" represented a purchase of "Decorticated Cotton Cake Meal" at 6*l.* 8*s.* 9*d.* per ton. The vendor admitted that it should have been called "Partially Decorticated Cotton Cake Meal," and allowed 10*s.* per ton.

From the statement of the above cases, and from other information that has come to me, it is very clear that a considerable trade has been done in this adulterated meal. Shippers on the other side and agents on this must have known perfectly well what they were selling, and have, no doubt, in many cases, taken advantage of the smaller dealers throughout the country, who, in their turn, have—often innocently enough, no doubt—retailed it to the farmers.

It is only to be regretted that want of public spirit or the difficulties in the way of applying the Fertilisers and Feeding Stuffs Act have prevented an example being made in any case of this class.

4. *Compound Cakes.*

After the warnings given by me, it is satisfactory to note that there have not been so many inferior compound cakes sent in this year. One of these, however, I reported as being "an inferior cake of bitter taste, and acid in character, made from materials not properly cleaned." It contained 2·95 per cent. of sand, and cost 6*l.* 5*s.* per ton. It was known as the "Diamond" cake.

5. *Rice Meal.*

I have received some decidedly unsatisfactory samples of this meal, containing excessive husk, owing, no doubt, to the husks of the rice grain having been ground up and put back into the meal, as was done in the case of decorticated cotton meal just described.

The following are two instances in point :—

	A	B	Genuine rice meal C	Rice husks D
Moisture	9·47	10·05	10·30	12·53
Oil	5·52	7·86	8·52	1·40
[1] Albuminous compounds	8·00	10·18	12·93	4·94
Starch, digestible fibre, &c.	35·76	54·04	54·39	28·95
Woody fibre	28·49	10·92	4·76	33·52
[2] Mineral matter (ash)	12·76	6·95	9 10	18·66
	100·00	100·00	100·00	100·00
[1] Containing nitrogen	1·28	1·63	2·07	0·79
[2] Including silica	9·52	2·55	2·90	14·67

"A" was a purchase of 4 tons "Rice Meal" at 4*l.* 13*s.* 9*d.* per ton. My report was, "This is not rice meal, and should not be so described. It is about three-quarters ground rice husks of little or no feeding value, and one-quarter rice and rice meal." Ultimately the vendors, a Liverpool firm, expressed their regret, and 25*s.* per ton only was paid instead of the original charge of 4*l.* 13*s.* 9*d.* per ton.

"B" was a sample of a purchase of one ton of "Rice Meal" at 5*l.* 17*s.* 6*d.* per ton. This also had been obtained from Liverpool. It contained—as reference to the analyses C and D will show—an excessive quantity of woody fibre. There was also some admixture of maize meal.

6. *Maize "Germ."*

Maize germ has frequently been referred to before, and is a very good food, especially useful for dairy cows. But, when purchasing it, it is well to see that it is really maize germ, and not in great measure ground maize that is being sold. Such was the following sample A :—

	A	Maize meal B	Maize germ C
Moisture	11·69	11·89	10·06
Oil	4·96	3·87	10·78
[1] Albuminous compounds	10·37	9·92	12·75
Starch, digestible fibre, &c.	67·69	70·25	58·60
Woody fibre	3·80	2·73	4·28
Mineral matter (ash)	1·49	1·34	3·53
	100·00	100·00	100·00
[1] Containing nitrogen	1·66	1·59	2·04

The sample "A," it will be seen, was not "Maize Germ" properly called, but had a great deal of broken maize with it. It was practically no better than maize meal.

7. *Biscuit Chippings.*

The only new feeding material brought to my notice has been the chippings off sugar-iced wafer biscuits, as left by confectionery makers. These, of course, are very sweet, and in two instances brought to my notice were offered to dairy farmers for their cows. Analysis gave the following figures :—

Moisture	10·60
Oil	1·36
[1] Albuminous compounds	11·31
Sugar, starch, &c.	75·78
Mineral matter (ash)	0·95
	100·00
[1] Containing nitrogen	1·81

The price at which this—a refuse material—was offered, was 6*l.* 10*s.* per ton on rail, which, to my mind, is distinctly dear, and, moreover, I should not consider the material a very suitable food for stock.

B. Fertilisers.

1. *Superphosphate.*

Of the 38 samples sent for analysis two only have given below 26 per cent. of "soluble phosphate," and there has been very little to find fault with as regards the condition of the samples. An instance of a very cheap purchase was a superphosphate which gave 34·26 per cent. of soluble phosphate, and cost only 2*l.* 16*s.* per ton in Northamptonshire.

2. *Dissolved Bone Manure.*

As usual, there have come from the North of England and Border counties instances of cheap and good manures of this class. The following is a case in point:—

Moisture	12·80
[1] Organic matter, water of combination, &c.	24·29
Monobasic phosphate of lime	14·62
(equal to tribasic phosphate of lime rendered soluble by acid	29·92)
Insoluble phosphates	12·34
Sulphate of lime, &c.	33·86
Sand	2·09
	100·00

[1] Containing nitrogen	2·53
Equal to ammonia	3·07

This manure cost, in March 1901, only 5*l.* 0*s.* 9*d.* per ton, delivered at the nearest station (in Ayrshire), and must be considered very cheap.

3. *Basic Slag.*

More attention has, I think, been paid to the quality and the fineness of grinding of basic slag. The samples sent me have, as a whole, been very satisfactory. Of the seventy-five samples, nine have given over 20 per cent. of phosphoric acid, thirty-two have shown 17 per cent. and over, while eleven have given below 15 per cent. As regards fineness, sixty of the seventy-five samples have been of 80 per cent. fineness, or higher, and I have no instance of a lower percentage than 70 being recorded.

The following was a very cheap purchase. Analysis gave:—

	Per cent.
Phosphoric acid	19·39
(equal to phosphate of lime	42·34)
Fineness	86·20

The price was 35*s.* 6*d.* per ton delivered in Sussex.

4. *Peruvian Guano.*

Last year I drew attention to the considerable sale of Peruvian guanos of a phosphatic kind, and at very reasonable prices. This year, owing to new importations from the Chincha Islands, the purchases have been mainly in Peruvian guano of an ammoniacal nature, rather than phosphatic. Indeed, of the fourteen samples sent me, two only have been of the phosphatic kind. The others have ranged from 6½ per cent. of ammonia to as much as 16·3 per cent. The following are instances of Peruvian guanos of good or very high quality sold at reasonable prices:—

	A	B	C	D
Moisture	19·77	17·68	16·85	18·44
[1] Organic matter and salts of ammonia	26·81	28·40	45·72	48·40
Phosphate of lime	26·99	22·21	16·08	12·39
[2] Alkaline salts, &c.	19·10	15·34	8·36	9·98
Sand	7·33	16·37	12·99	10·79
	100·00	100·00	100·00	100·00
[1] Containing nitrogen	6 88	7·13	12·91	12·91
Equal to ammonia	8·35	8·65	15·67	15·67
[2] Containing phosphoric acid	5·27	4·24	1·95	3·14
Equal to phosphate of lime	11 50	9·25	4·25	6·85
Total phosphate of lime	38·49	31·46	20·33	19 24

"A" cost 8*l.* 6*s.* 3*d.* per ton delivered (in Kent). "B" cost 7*l.* 7*s.* per ton delivered (in Kent). "C" cost 14*l.* per ton delivered (in Norfolk). "D" cost 13*l.* per ton delivered (in Kent).

5. *Horn.*

The following analyses of the horns of a fallow buck and of a red stag respectively may be of interest.

	Fallow buck	Red stag
Moisture	11·25	10·56
[1] Organic matter	47·31	40 03
Phosphate of lime	37·24	43·92
Carbonate of lime, &c.	4·15	5·44
Siliceous matter	0·05	0·05
	100·00	100·00
[1] Containing nitrogen	7·86	6·45
Equal to ammonia	9·54	7·83

The horn of the red stag was much the denser of the two, and contained more phosphate of lime and less animal matter.

6. *Quail Manure.*

A sample of this gave the following analysis :—

Moisture	11·51
[1] Organic matter	65·80
Phosphates	3·21
Alkaline salts	4·57
Sand	14·91
	100·00
[1] Containing nitrogen	3·94
Equal to ammonia	4·78

7. *Expensive Manures.*

Happily now, through the introduction of the Fertilisers and Feeding Stuffs Act, it is compulsory, when selling manure in any quantity of over ½ cwt., to give an invoice setting out what amount of fertilising ingredients the manure shall contain. Though this be done, it does not always follow, as the instances given show, that money value is obtained, though the guarantee be satisfied :—

	A	B
Moisture	18·24	4·03
[1] Organic matter	17·72	45·73
Monobasic phosphate of lime	5·22	11·33
(equal to tribasic phosphate of lime	8·16	17·74)
Insoluble phosphates	2·71	9·67
Sulphate of lime, alkaline salts, &c.	17·98	27·34
Sand	38·13	1·90
	100·00	100·00
[1] Containing nitrogen	1·25	5·75
Equal to ammonia.	1·51	6·98

In the case of "A," a manure sold at the price of 3*l*. 10*s*. per ton delivered, a guarantee was given that it should contain 1½ to 2 per cent. of ammonia, and 8 to 12 per cent. of phosphates. The guarantee certainly was satisfied, but the manure cost quite double what it was worth.

"B" was a horticultural manure, sold as containing ammonia, 6·50 to 8 per cent., phosphates, 25 to 26 per cent., potash, 6·50 to 7 per cent. It was composed mainly of superphosphate, bone meal, dried blood, and little sulphate of ammonia and potash salts; the price was 20*s*. per cwt. Now the case of horticultural manures is, it must be pointed out, very different from that of manures used for field purposes. Very generally the former are retailed out in quite small quantities, in tins or boxes; the cost of preparing and issuing these, the employment of numerous agents, and other necessary expenses, oblige such horticultural manures to be considered on a footing different from that of the ordinary manures of the farm, at least when sold in small quantities. If sold, however, in quantities of a ton or so, such a manure as "B" would not be worth above 7*l.* or at most 7*l.* 5*s.* a ton.

The following is a list of analyses made for members of the Society during the twelve months December 1, 1900, to November 30, 1901 :—

Linseed cakes	72
Undecorticated cotton cakes	37
Decorticated cotton cakes	37
Compound feeding cakes and meals	46
Cereals	7
Dried grains	2
Superphosphates	38
Dissolved bones and compound artificial manures	34
Raw and degelatinised bones	36
Peruvian guanos	15
Fish and meat guanos	21
Basic slag	75
Nitrate of soda	10
Sulphate of ammonia	5
Potash salts	10
Salt	1
Shoddy	26
Hoofs and horns	4
Rape dust and manure cakes	4
Lime	4
Butter, milk, and cream	20
Waters	138
Soils	15
Miscellaneous	25
Total	682

J. Augustus Voelcker.

13 Hanover Square, W.

ANNUAL REPORT FOR 1901 OF THE CONSULTING BOTANIST.

During the twelve months from December 1, 1900, to November 30, 1901, 252 inquiries have been answered on behalf of the members of the Society. Of these 138 referred to the quality and vitality of seeds; the remainder dealt with injuries to plants and other matters which are the subject of this report.

Diseases of Plants.

1. *Leaf Disease in the Cherry Orchards of Kent.*

A leaf disease of cherries was reported in December 1900 from several orchards in the county of Kent. In the early summer it affects the leaves and fruit simultaneously, rendering the latter unfit for market. In autumn and winter its presence is easily detected. The diseased leaves remain attached to the branches as if the tree had been killed in the full vigour of growth, just as the withered leaves remain on a branch that has been severed from its stem.

The fall of the foliage in autumn is a normal process carried out by the living leaf, which forms at the point of its attachment to the branch a cicatrix that secures when completed the easy severance of the leaf from the branch, leaving a clean scar. The speedy and fatal injury to the leaf caused by the fungus prevents the formation of this cicatrix, and the leaf remains attached to the tree.

A further striking characteristic of this disease is the shortening of the year's twigs which bear the diseased leaves. The internodes or joints between the leaves of these branches have scarcely been developed. The dwarfing of the branch is not due to any attack from a fungus, for no fungus is present in the tissues. The dwarfing is entirely due to the want of food, consequent on the early death of the leaf. That this is the case is confirmed by the fact that some of the dwarfed branches have produced in the following year vigorous normal shoots.

The leaves were not received until late in the year, when they were found to be spotted with groups of minute black fruits (perithecia) of a fungus, probably a *Phoma*. In addition, the leaves were studded with somewhat larger and more scattered circular spots, which were the bases of ripened perithecia whose contents had been dispersed. A section through the leaf shows that its proper tissue is much disorganised, and is everywhere penetrated and destroyed by a brownish mycelium. Sections through the leaf-stalk show also a very luxuriant growth of the same mycelium which is

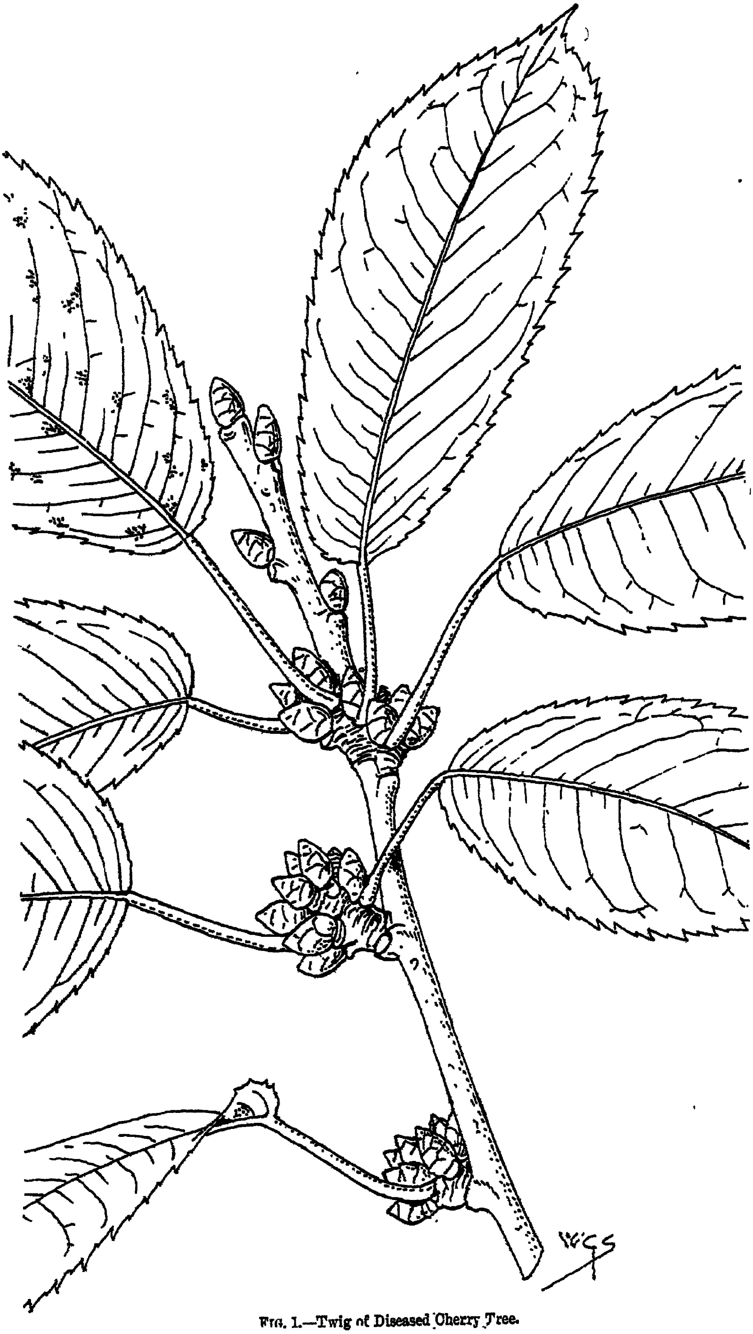

FIG. 1.—Twig of Diseased Cherry Tree.

confined to the cortical tissue. It is very irregular in form and pushes its way between the cells. It does not extend beyond the petiole, stopping short at the part where the large cortical cells of the petiole are in contact with the small round compact cells of the twig into which the fungus does not penetrate.

In the beginning of October 1901 I received, by the kindness of Mr. De Laune, leaves which show these perithecia with their mature contents. They are round, flattened bodies developed under the epidermis of the leaf. There is an outer wall of rather loose tissue, and the cavity is filled with upright filaments which bear slender curved colourless spores. This form belongs to the genus *Septoria*, and it has been shown to be the early stage of *Gnomonia erythrostoma.*

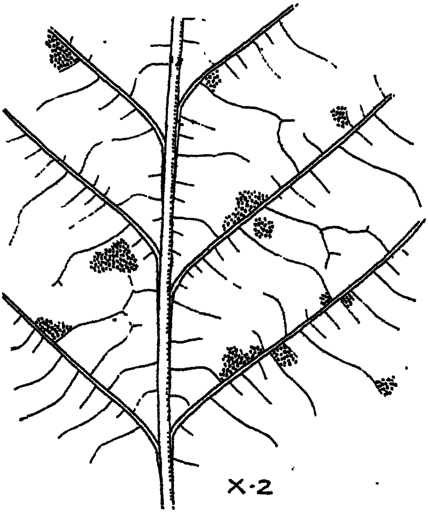

FIG. 2.—Fragment of Leaf of Cherry Tree showing groups of *Phoma* (?).

The disease has been spreading rapidly in Kent during the last few years. The varieties of cherry trees that have been reported as specially liable are Waterloo, Bigarreau, Frogmore, Napoleon, Blackhearts, Clusters, and Eltons. Turks and Governor Woods have not as yet suffered much, and English and Flemish Reds and May Dukes have not been attacked, though odd trees of other varieties, such as Bigarreau, growing among them have been diseased.* In one orchard the fungus attacked "Waterloo" first, soon spreading to other kinds, while at another place this variety had not been affected until last year, and then only the leaves had suffered; the fruit had not been damaged.

Professor Frank, of Berlin, in several papers in 1886, 1887, and 1891, and Dr. Goethein *Gartenflora* 1887, have described a serious injury to cherry trees which, there is little doubt, is the same as the disease that has attacked the cherry orchards in Kent. The malady was first observed in the cherry orchards of the Altenland on the Lower Elbe in Germany about the year 1880, and it soon spread widely. About the middle of June, yellow spots make their appearance on the leaves, and at the same time the young cherries begin to fail. They are stunted in growth and the flesh of the fruit forms irregularly, or rottenness sets in so that the cherries are quite unsaleable.

These authors found an abundant mycelium in the tissue of the leaf underneath the yellow spots, and also in the damaged cherries. During the summer small perithecia filled with long curved spores were developed on the yellow spots. These I have already described from the specimens recently received from Mr. De Laune. The diseased leaves remain on the tree all winter, and are intermixed with the new foliage of the following season. In spring were found on the dead leaves a fungus fruit that had not been present on them in autumn, a perithecium round at the base, and tapering up into a pointed beak that projects from the under surface of the leaf. These perithecia contain the spores that re-infect the young leaves and fruit. The fungus had already been described by Auerswald, under the name of *Gnomonia erythrostoma.*

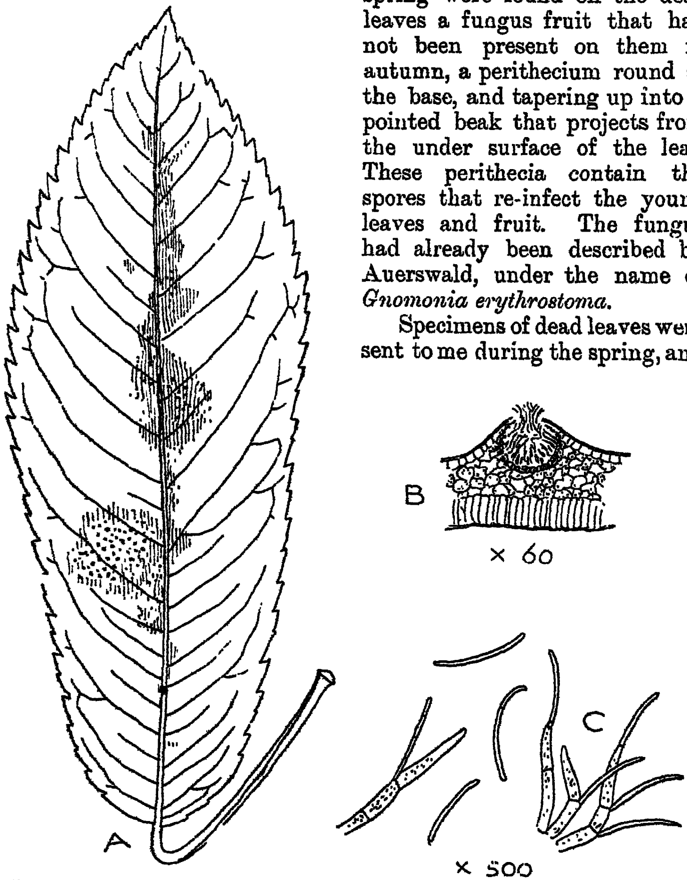

FIG. 3.—A. Leaf of Cherry Tree with the Septoria stage of the disease. B. Section of the Septoria perithecium. C. Spores of Septoria, some still attached to the filaments.

Specimens of dead leaves were sent to me during the spring, and by keeping them moist for a time it was possible to observe the development of the *Gnomonia* stage of the fungus. The perithecia, which are about $\frac{1}{100}$ of an inch in diameter, were found to be scattered more or less thickly over the leaf, the small pointed beak projecting from the under surface. The spores are two-celled and colourless, and are contained in cylindrical asci.

The rapid spread of the disease in the Altenland is traced to the overcrowding of fruit trees and to the presence of open ditches in the neighbourhood of the orchards causing too much moisture, and so presenting conditions favouring the growth of parasitic fungi. While such adverse conditions should be remedied, it is recommended, as the only method of stamping out the disease, that the diseased leaves should be gathered and burned. It is the more essential that steps should be taken for the destruction of the dead leaves because of the abundant presence of the living fungus that has been observed in them. It would be a certain source of danger to the new crop if these active fungi were to be permitted to grow on the dead leaves while they remain attached to the trees. To be efficient, this collecting and burning of the dead leaves must not be done in a solitary orchard here and there, but must be carried out throughout Kent. No doubt this must entail much trouble and considerable expense. But the neglect of undertaking this operation, though costly, means the disappearance of the cherry orchards of Kent in a very few years. The removal and burning of the dead leaves has been successful on the Continent, and there is no reason why it should not be equally successful in Kent.

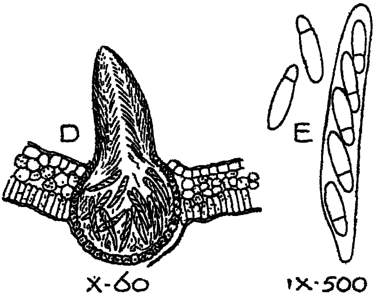

FIG. 4.—D. Section of the perithecium of *Gnomonia.*
E. Ascus and spores of *Gnomonia.*

This advice, with some account of the disease, was printed as a leaflet and distributed extensively by the Society among the cherry growers in Kent early in the year. I have heard from two gentlemen who acted on the recommendation. Mr. De Laune gathered and destroyed the dead leaves over as large a portion of his extensive cherry orchards as he was able to overtake. There is throughout the orchards not so great a difference as he had hoped for. Yet in a young orchard where hardly a leaf fell last year, and where they were all picked off and removed, there is scarcely a single leaf remaining attached to the branches this winter. Mr. W. A. Skinner has had a similar experience. In the part of the orchard where the leaves were picked off, there is no evidence this winter of disease. The application of sulphur has made a slight improvement in the diseased trees where the leaves were not removed. Mr. Skinner has resolved to pick all the leaves off this year, as he believes this to be the only sure way to cure the disease.

The season of 1901 has been singularly favourable to the cherry growers, who obtained a large crop free from disease. The remarkably dry weather up till the ripening of the crop prevented the germination of the fungus spores. The change that has taken place since has favoured the activity of the fungus, and the result is that the continued presence of the disease is manifested by the persistent attachment of some diseased leaves. But Mr. De Laune estimates that the killed leaves are about eighty per cent. less than last year.

2. *Other Diseases.*

Some of the cherries had little brown flecks caused by a form of *Cladosporium epiphyllum.* The growth of the fungus was entirely superficial and the mycelium had not penetrated into the tissue of the cherry, but the growth of the fruit was arrested at the spots attacked. The dead hanging leaves were a favourable habitat for various fungi, among others of *Cladosporium epiphyllum*, which had spread to the cherries. It is not a disease to cause any apprehension, and will probably disappear with the dead leaves.

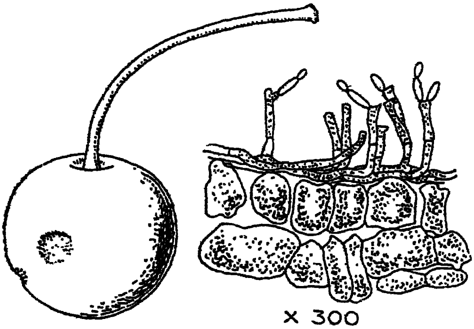

FIG. 5.—Cherry attacked by *Cladosporium*, and magnified section of the skin with the *Cladosporium.*

Another disease of cherries, popularly called "bull-boughs," was found to be affecting the trees here and there. It is a form of

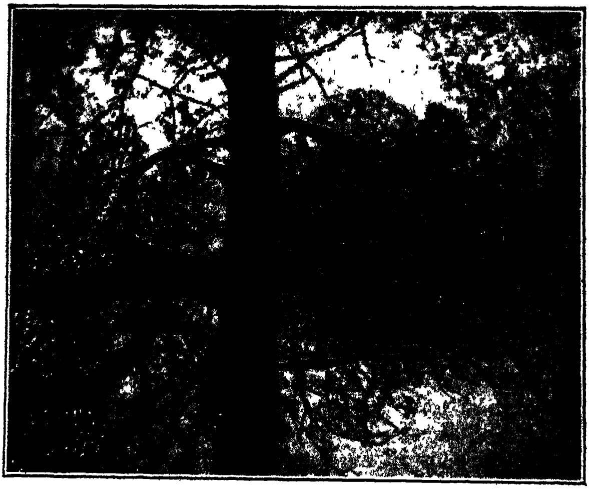

FIG. 6.—Distorted branches of Cherry Tree caused by *Exoascus.*

Witches' broom caused by *Exoascus cerasi.* The branches in which the mycelium of the fungus lives from year to year are excited to unnatural growth and are much swollen and distorted. The leaves have a reddish colour in spring and the diseased branches bear little or no blossom. The fungus produces its spores usually on the under-side of the leaf in closed tubes or asci, which grow closely packed together and form a white bloom on the under-surface of the leaf. The diseased branches should be cut off and burnt. Some species of *Exoascus* have caused widespread damage to fruit trees. *Exoascus cerasi* is rare in England.

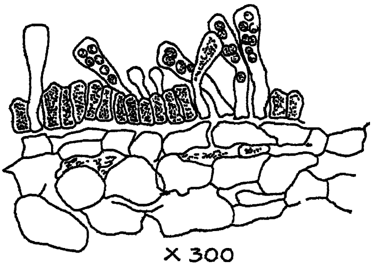

FIG. 7.—Section of leaf with *Exoascus.*

A peach tree in Kent was found to be much injured by mildew, the Oidium form of *Sphærotheca pannosa,* nearly related to the Hop mildew. The sprays used for the hop mildew would destroy that formed on the peach tree, but the solution should be weaker or it would damage the more tender foliage of the peach.

Some Yorkshire fog from Norfolk was attacked by *Epichloe typhina.* This fungus swathes the stalk of the plant with a close whitish felt of hyphæ which checks all growth above the part affected. Any grass seen to be attacked should be cut down before the spores have time to be formed. *Epichloe* is not confined to one host, but spreads to any grasses within reach and may do considerable injury to pastures.

From Northamptonshire there were received a number of tulip bulbs covered with the black sclerotia of *Sclerotinia parasitica.* This disease can be detected by noting on the leaves the appearance of a previous stage of the fungus *Botrytis parasitica,* which forms grey velvety patches consisting of upright, brown, branching filaments, with heads of whitish spores. The diseased bulbs should be burnt, and the ground used for other plants for a time. A form of *Botrytis* was also found on tulips from Cambridgeshire, but no sclerotia had developed and it was uncertain if it belonged to *Sclerotinia parasitica.* A correspondent in Hertfordshire wrote that he had cured bulbs attacked by a similar fungus by immersing them for some weeks in a powdered mixture of French chalk and copper sulphate called "sulphostite." The cure seems to have been as effectual as it was simple.

Sclerotinia trifoliorum was reported from Lincolnshire, where it was causing much damage to a field of red clover. The members are again referred to the account of the disease published in the Society's Journal, Volume for 1898, p. 752.

A closely allied species, *Sclerotinia sclerotiorum,* had attacked a field of beans in Essex. The same methods must be followed in treating this disease as those recommended for *S. trifoliorum.*

The diseased twigs of a rose tree from Cambridgeshire were found to be distorted from the presence of the Æcidium form of the rust *Phragmidium sub-corticatum*. The different stages of the rust all develop on the same host, and the fungus can be destroyed by spraying the plants with a solution of copper sulphate. The diseased twigs and leaves should be gathered and burned.

Some wheat plants that had been damaged by insects were also more or less affected by rust, *Puccinia graminis*, and the same fungus was found growing on wheat and barley from Norfolk, though the chief damage done to the straw was by *Cladosporium herbarum*, a harmful parasite of cereals.

There were two cases of smut reported: *Ustilago Jensenii*, Rostr., the covered smut of barley, from a field in Norfolk, and *Ustilago avenæ*, Jens., the smut of oats. A full account of the smuts and the best methods to be used for killing the spores is to be found in the Society's Journal, Volume for 1896, p. 143.

A less common example of a smut, *Urocystis anemones*, was sent from Cambridgeshire. It had attacked winter aconite, *Eranthis hyemalis*, Salisb. This *Urocystis* has been observed on several plants of the order *Ranunculaceæ*.

A piece of turf from a lawn was sent from Kent with some fungi growing on it. One of these was found to be a mycetozoan, one of a harmless family of organisms that inhabit dead wood, leaves, &c. The mycetozoan exists at first as a plasmodium, a mass of slimy protoplasm that has the power of movement, and creeps over and through the dead wood, &c., in search of food. At a later stage, spores are formed which resemble the spores of some fungi, and these spores give rise after a time to little specks of protoplasm which flow together and again form a plasmodium. The mycetozoan in question, *Badhamia foliicola*, was found for the first time by Mr. A. Lister a few years ago and described by him in the "Journal of Botany," 1897, p. 209. The plasmodium is bright orange yellow ; in the specimen sent to me it began to creep over the damp blotting paper on which the turf had been placed. The spores were formed in great abundance in little round cases, or sporangia, which quite covered some of the blades of grass. The spores and sporangia are dark coloured, but the latter are encrusted with lime granules which give them a grey tinge.

A good part of the turf was also covered by a white mycelium, the spawn of some undeveloped fungus. It was carefully cultivated in the hope that it might exhibit characteristics which would assist in the identification of the species, but without success.

Towards the end of August specimens of turnips were received from Gloucestershire, attacked by the bacterium which was described and figured in last year's report.[1] The root crop looked very well and vigorous throughout the district, but everywhere turnips were seen dying off, and at the time the specimens were sent, half of the crop was diseased. The turnips were young, but the bacteria had got possession of the root and had cut off the living communication between the crown of young leaves and the root. The cells of the tissue were still intact, but everywhere bacteria were present, and in the parts attacked the substance of the root was discoloured. In the progress of the disease this portion may become an empty cavity from the destructive action of the sunlight, which would gain free access to the bacteria in the root after the decay of the crown leaves. The treatment for this malady recommended in last year's report should be followed.

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[1] Journal R.A.S.E., Vol. for 1900, p. 738.

WEEDS.

Ononis arvensis (Rest-harrow), fig. 8. A perennial leguminous plant with a long fibrous root. The stems die down in winter but the root produces new stems in the following year. The flowers are rose-coloured. This is too common on poor pastures. It produces many seeds and readily multiplies. It can be got rid of only by digging or ploughing.

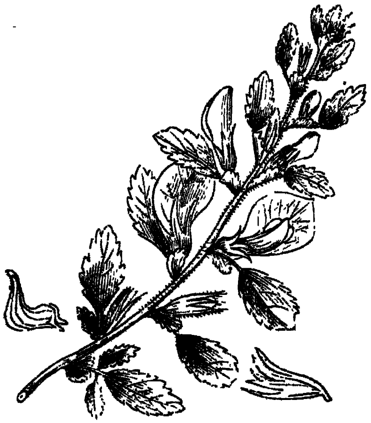

FIG. 8.—Rest-harrow.

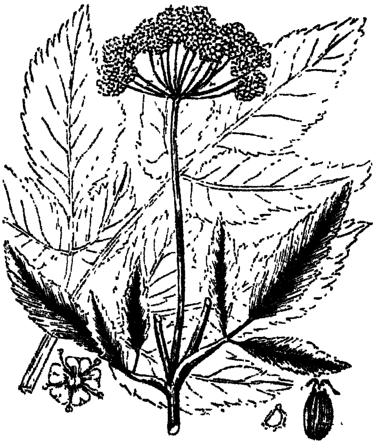

FIG. 9.—Gout-weed.

Ægopodium Podagraria (Gout-weed), fig. 9. A perennial umbelliferous plant, with a long, creeping rootstock which sends up stems at frequent intervals. It has a large head of small white flowers. It grows under hedges and in waste places. The leaves are eaten by stock without injury.

Carduus acaulis (Stemless Thistle), fig. 10. A dwarf composite with a sessile head of purple flowers. The leaves spread out on the ground and destroy the vegetation below them. The plant spreads underground and throws up new plants all around. It is a most troublesome weed, and should be spudded out wherever it appears, for it spreads rapidly and is difficult to eradicate.

Senecio Jacobæa (Ragwort), fig. 11. A well-known and most troublesome weed in pastures and meadows. It was thought that it might be the cause of the death of some lambs. There is no record of any injury being caused by this plant, which is rejected by all stock, and eaten only when no other food can be got.

Matricaria inodora (Dog's Camomile), fig. 12. A white flowered composite with leaves divided into numerous hair-like segments—very like the common camomile but scentless. This is an annual weed growing in cultivated fields and by road sides. It should be cut down when beginning to flower before the seeds have formed. The plant was sent because it grew up abundantly where the ashes from an iron furnace were used, and it was thought that perhaps the seeds had come through the fire

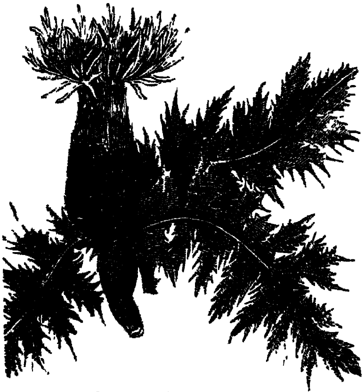

FIG. 10.—Stemless Thistle.

Information has been supplied as to a weed called in Victoria, Australia, "Mothermarm," that was determined from the seeds and capsules to be *Silene anglica*, a widely distributed British weed which has been introduced into that colony and which proves a serious pest to the farmer in his oats; also as to varieties of lucerne

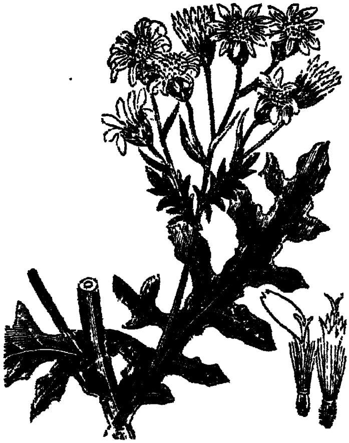

FIG. 11.—Ragwort.

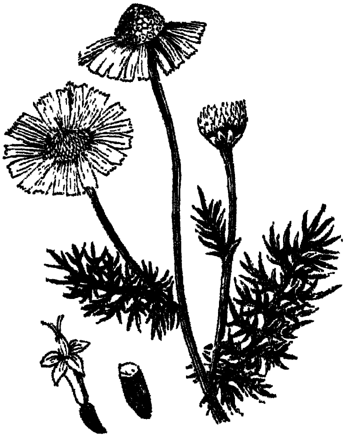

FIG. 12.—Dog's Camomile.

found growing in a field satisfactorily laid down with this plant; and as to cultivated vetches, vetchlings and clovers.

Inquiries as to the use of copper sulphate for the purpose of destroying fungi on trees, and for killing the spores of smut on seed corn, were attended to, and the proper ingredients of the mixture were given.

Several official inquiries were dealt with. From the War Office came a question as to "the ratio of husk and kernel in different samples of oats, viz. at 32, 34, 36 and 38 lb. per bushel." In reply, I stated that I had no knowledge of this ratio, and I was not aware that any experiments had been made to determine it, but that theoretically it seemed that, the growth of the husk being completed before a marketable grain of the lowest weight per bushel is produced, whatever increase there is thereafter in the weight per bushel results from the complete maturation of the kernel, and is consequently all gain for feeding purposes. I also stated that the relative weights of husk and kernel differed in different varieties, some having thin and others thicker husks, but that that was another question than the one asked. No doubt a bushel of a particular variety of oats weighing 38 lb. has practically 6 lb. more available food than a bushel of the same variety weighing only 32 lb.

From the United States Department of Agriculture inquiries were received as to the different varieties of red clover under cultivation in Britain, and the English names by which they were called, and as to the way in which trustworthy seeds of these clovers could be obtained. Full particulars were sent to the Department.

From the County Technical Laboratory, Chelmsford, an inquiry reached me as to the seeds of weeds found in feeding cakes. Samples of the weeds collected from cakes were submitted, and were named, amounting in all to twenty-three kinds.

I have received two species of brome-grass from members of the Society which were in abundance in their cereal crops. In answer to their complaints, the dealers from whom they were purchased informed them that each grass was due to a reversion to the original wild type. It is scarcely credible that any dealers could in these days venture such an explanation and expect it to be accepted by farmers.

The one grass is *Bromus mollis*, Linn. (soft brome-grass), a very common weed everywhere on road sides, in temporary pastures, in cornfields, and occasionally in meadows and pastures, especially in light soils (fig. 13 on p. 252). According to Knapp, in the beginning of last century this grass was sown with clover, as ryegrass is in Dumfries, Lanark, and other counties in the South of Scotland.

It is an annual grass, but under favouring conditions it rapidly increases. It is an early grass, ripening its seeds in the end of May or beginning of June before the hay is cut. The operation of hay-making scatters the seeds, which germinate freely. In conse-

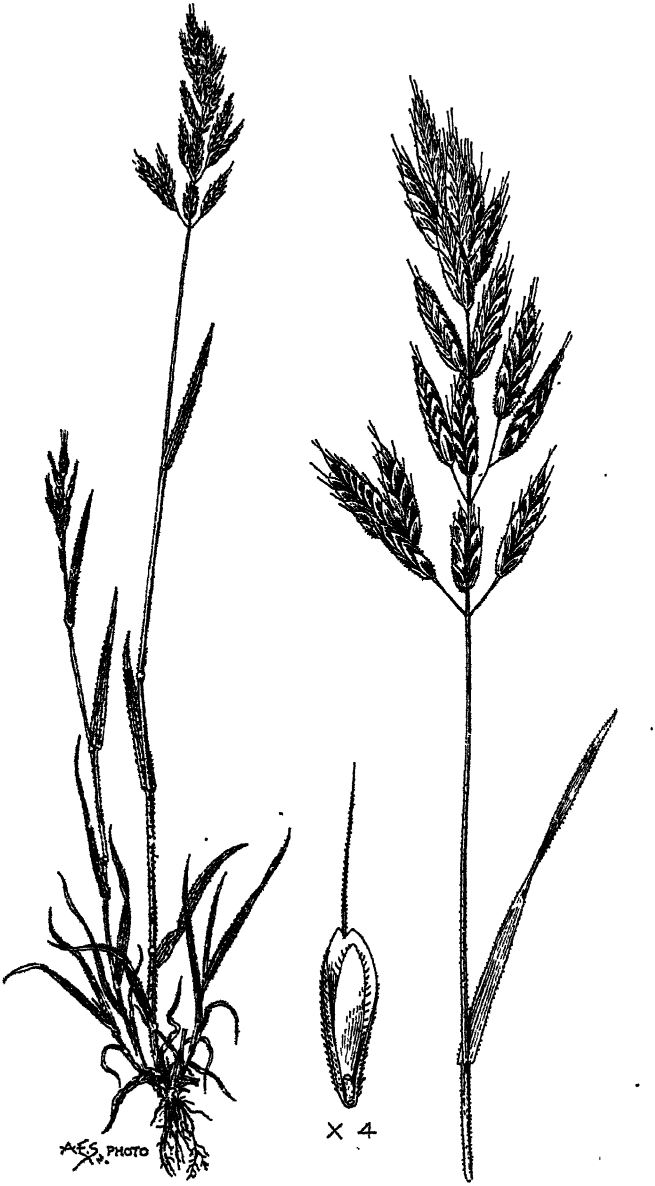

FIG. 13.—Soft Brome-grass (*Bromus mollis*). With a flowering spike natural size, and seed four times natural size.

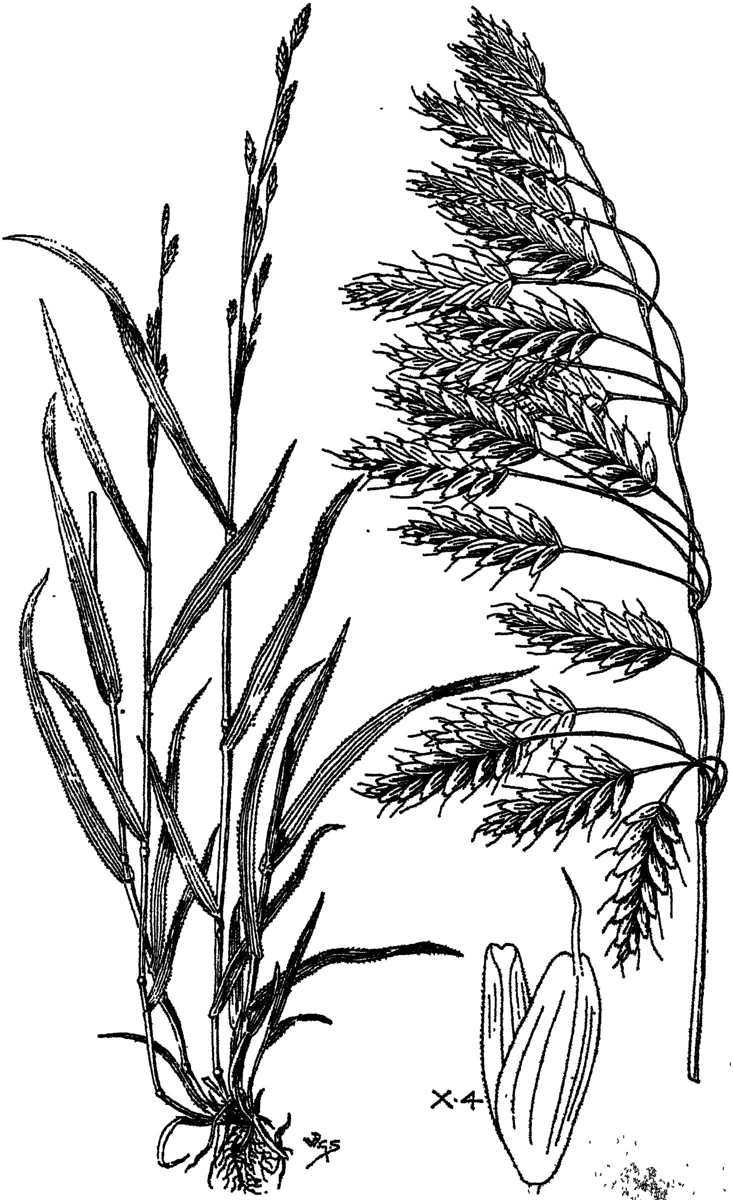

FIG. 14.—Smooth Brome-grass (*Bromus secalinus*). With a spike in seed natural size, and seed four times natural size.

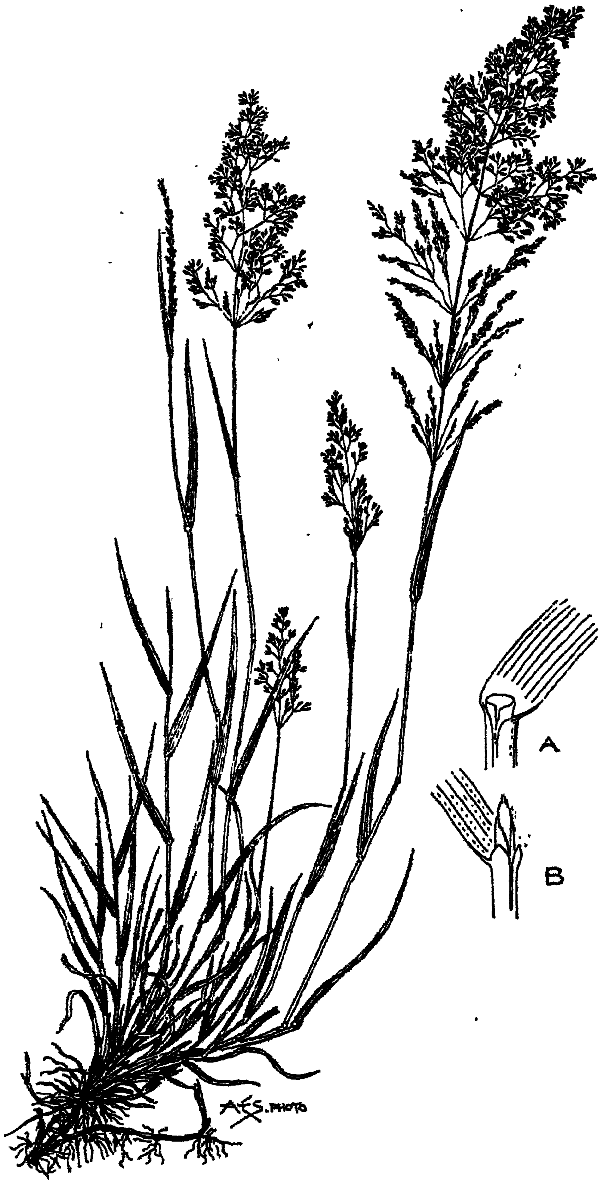

FIG. 15.—Common Bent Grass (*Agrostis vulgaris*), with magnified representations of the ligules: A, Common Bent Grass; B, Fiorin.

quence this grass spreads more rapidly when the field is in hay than when in pasture. It does not always come with the seeds from the dealer, but it is scarcely ever absent in ryegrass seeds, though generally occurring in very small quantities; but a single plant here and there, even though no more than one per cent., will soon spread the grass over the field. Buyers should require a guarantee that their ryegrasses are free from brome-grass. Stock do not eat it, and it is consequently a worthless weed. Its presence in any amount lessens the value of the hay, and destroys the quantity by preventing the growth of better grasses on the ground it occupies.

The second grass, which is said to be degenerated corn, is *Bromus secalinus*, Linn. (fig. 14 on p. 253). It is a cornfield weed, but not so common as in former years, because of the work of the Royal Agricultural Society in improving the purity of seeds. Nevertheless, it is occasionally found in considerable quantity among corn. This year a bad case was reported to me. It looks more like a degenerated corn than the soft brome. It is an annual grass, and attains a height of from three to four feet. The branches of the inflorescence rise upwards when young, but they hang down when ripe, the slender stalks being unable to support the ripe seeds; the individual grains spread somewhat out from the axis. The only remedy for this weed is to procure pure seed.

There is another grass to which I desire to call attention—*Agrostis vulgaris*, With. (Common Bent-grass) (fig. 15). Some botanists consider *Agrostis alba*, Linn. (Marsh-grass, or Fiorin), as the same species. They can, however, be easily distinguished by the form of the membranous appendage which springs from the summit of the leaf sheath opposite the longitudinal slit that runs down the sheath. The easiest way to observe this appendage, called the ligule, is to pull the leaf carefully from the stem, when it will be found rising from the sheath, and resting on the inner surface of the leaf.

In the common bent-grass, *A. vulgaris*, the stipule is very short and truncate, while in fiorin the ligule is long and acute, and often split by two or three fissures. Both plants are stoloniferous in suitable situations, but the bent-grass is very abundant in dry upland pastures, where it seldom produces stolons. Fiorin, on the other hand, is found in moist fields and meadows. When the common bent is in damp soil it freely sends out stolons.

These two plants readily seed, and as they are equally disliked by horses, cattle, sheep, and deer, the seeds ripen, and the increase of the plants is rapid. Besides, they increase by their numerous stolons, which run for long distances along the surface of the ground, forming a dense covering to the soil, sometimes as much as three inches thick, and this chokes out all other vegetation.

I have seen in Cheshire a considerable sized field with a good soil, where scarcely another plant was to be found besides this common bent. It grew vigorously and formed a thick cushion over the whole field. It was next to useless for feeding purposes; the stock would eat it only when compelled by hunger. This I have found to be the case in all pastures, where it is plentiful, all over

England. In my experience it is the last grass to be eaten in mixed pastures. Converted into hay, it is said that it is liked by stock.

Both species should be excluded from all mixtures for laying down pastures. Bent-grass is unfit to be used for lawns in soils where there is a fair amount of moisture, for it throws out its creeping stolons, forming a more or less thick matting which is very slippery. From mistaken observations it has been said to be a valuable element in hill pastures for sheep. But instead of being valuable, it is baneful; its obtrusive abundance in such pastures is due to its rejection by the sheep, and its consequent running to flower and seed.

The "boom" created for fiorin by Dr. Richardson was justified as long as the quantity of herbage only was taken into account, and the dislikes of the animals were not considered. The predominance of bent-grass in some pastures, from the abundance of its flowering and fruiting heads, has misled unintelligent observers, as in the case of other grasses.

Dogstail, Vernal Grass, and Ryegrass have been interpreted as giving value to the pasture, while their stems and fruiting heads testify only to the rejection of these grasses by the stock.

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ANNUAL REPORT FOR 1901 OF THE ZOOLOGIST.

INTRODUCTION.

During the past year inquiries have been received with regard to most of the ordinary farm pests, though few have presented points of special interest.

The clover-seed weevil has been particularly troublesome in certain districts, and bad attacks of the diamond-back moth on turnips have been reported from the extreme north of England.

The Frit-fly, a pest annually complained of in young oats, has done some damage, especially in late sown crops, and one case has arisen, apparently a novelty in this country, of attack on the grain in the ear by a later brood of this fly.

A remarkable feature of the past season has been the extraordinary number of inquiries with regard to insects destroying trees. Some of the insects sent were the symptom and not the cause of decay, but it is quite clear that the year has been an unusually bad one from the point of view of arboriculture, and the remark of one correspondent, "We seem this year to have had a plague of insects injurious to young trees," seems to express the experience of many members of the society.

A great deal of time has been given to the investigation of the life-history of the Black-Currant gall-mite, and the results arrived at are given with some detail in the present Report.

THE BLACK-CURRANT GALL-MITE.

Eriophyes (*Phytoptus*) *ribis*, Westwood.

Since the year 1896, when the disease due to the gall-mite was first observed on black-currant bushes in England, this pest has been steadily on the increase, and is at the present time the cause of great annual loss throughout the country.

Infested bushes are, unhappily, so familiar to most fruit-growers that there is little need to describe their appearance. In many districts it is almost impossible to find a bush without some of the brown, dry, abortive buds which have been killed by the mite, while the swelling and distortion of those leaf-buds in which the mites are still living are symptoms that strike the eye of every gardener.

The attack spreads slowly, sometimes being present to a certain extent for years on bushes, which still continue to bear a decreasing fruit crop. The vitality and recuperative power of the plant are astonishing to one who watches the progress of the disease. Some of the developing leaf-buds are destroyed by the mite, and to take their place some of the buds which are being elaborated to provide the foliage of the following year are prematurely developed. These in turn become attacked, and fresh calls are made upon the plant's

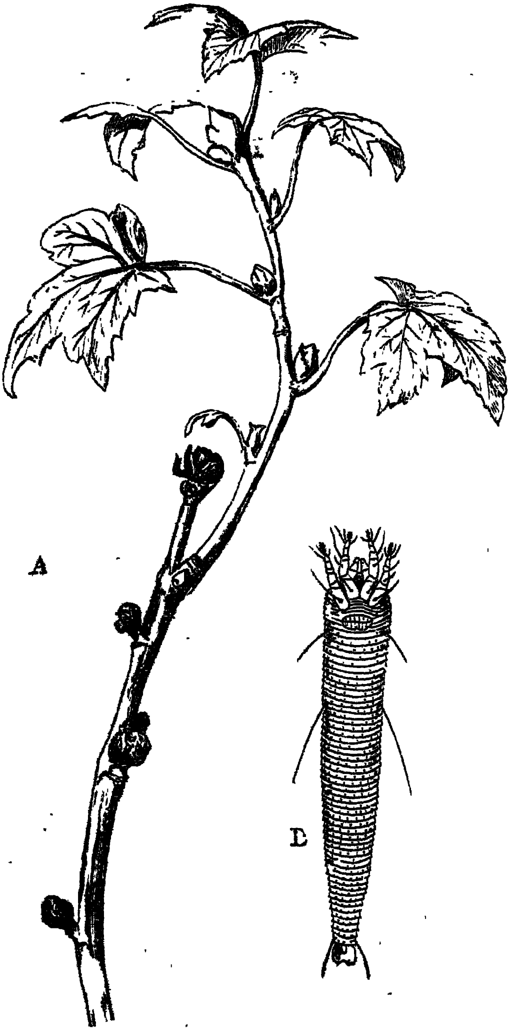

FIG. 1.—A, infested black-currant twig, showing old wood with dead buds, and new wood with sound and diseased buds.—B, the mite enlarged about 200 times, ventral view.

vitality. This cannot, however, go on indefinitely, and a time comes when the burden becomes more than the plant can bear. The crop fails, the leafage is reduced to a few feeble tufts at the ends of the branches, and the plant is eventually killed.

Though the black-currant gall-mite has been a recognised pest in England for more than thirty years, and though it is a maxim universally accepted that the first condition for the successful treatment of a pest is an accurate knowledge of its life-history, our acquaintance with the habits of the mite has hitherto been most imperfect. The accounts of such observers as have endeavoured to trace its life-history differ in important points, and the method of its distribution from bush to bush has been a matter of mere conjecture. It has followed that the various methods of treatment suggested have been almost entirely empirical, and that different times of the year have been recommended for the application of dressings which might possibly have a beneficial effect. This unsatisfactory condition of things is not due to any want of diligence on the part of investigators so much as to the inherent difficulties of the research.

It must be remembered that the mite does not exceed one-hundredth of an inch in length, and this is some six or eight times greater than its breadth.

It will easily be realised that though the condition of these minute creatures within the infested buds can at any time be readily made out with the aid of a good microscope, the difficulties are very great when it comes to tracing their methods of migration, and keeping wandering individuals under continuous observation for hours at a time.

The task, however, had to be undertaken, and I determined to attack it vigorously during the present year. In order that no important point should be overlooked it was necessary that infested bushes should be under practically daily observation till the research was ended, and a second observer was therefore almost a necessity. I was fortunate enough to obtain the assistance of Miss Alice L. Embleton, B.Sc. Lond., for this purpose, and with her aid the research has been carried on without intermission from the middle of May throughout the summer and autumn.

What practical result will follow is at present uncertain, but at all events some light has been thrown on certain obscure points in the economy of the mite, whose migratory habits have proved to be exceedingly curious and interesting.

A brief note in the Zoologist's Report for 1897 [1] details the results—mostly negative—of some observations and experiments on the mite during that year. It is there stated that during no single month of the year, except perhaps December, are the mites unaccompanied by eggs and young, and this tremendous fertility is cited as *a priori* evidence that a large proportion of the mites perish annually without effecting their purpose. It will be seen that further observations have very fully confirmed this view.

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[1] R.A.S.E. Journal, Vol. for 1897, p. 754.

As is well known, some of the mites survive the winter in diseased buds on infested bushes, and as these are the parents of all subsequent broods peculiar interest attaches to their fate.

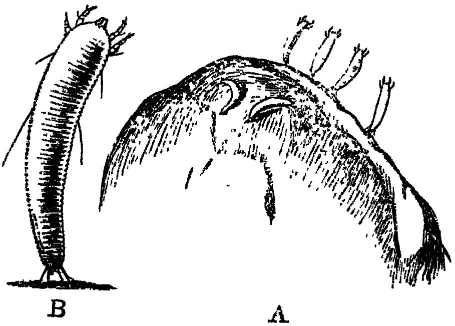
Now the buds are either so slightly diseased that they contrive nevertheless to open out and put forth leaves, or they are so seriously injured that they never develop at all, but eventually die and wither. In either case they become uninhabitable, and the mite is constrained to change its quarters. But there is an important difference in the two causes of migration. From the mite's point of view, expulsion through the development of the buds is undesirable and premature. It has not effected its purpose of completely arresting growth, and is turned out to face an inclement world before any new buds are formed in which it can take refuge. The individuals which several observers have found wandering about the stems in early spring are, in my opinion, homeless outcasts with nowhere to turn for shelter, and almost all of them must speedily perish. If this view is correct there is no reason for taking special measures for their destruction at this stage, and the labour and expense of early spring applications of insecticide washings may as well be saved.

The case is entirely different, however, with those mites which have succeeded in completely arresting the growth of the buds. They are provided with shelter and abundance of food until the buds become dry and sapless, and before this takes place the plant has elaborated the buds for next year's leafage, tiny as yet, but green and juicy, and well suited for the home of any of the emigrants which may be lucky enough to reach them.

It is with these abortive buds, therefore, and with the behaviour of their tenants, that we are chiefly concerned. During February, March, and April the mites within them multiply rapidly. About the middle of May some of the buds may be observed to be cracked, and on them the mites can be seen externally. From this time onward for three or four weeks the buds are gradually drying up, and becoming unfit for habitation, and a constant migration of mites is taking place. Let us examine the behaviour of the mites on the surface of the buds from which they are escaping.

Many of them are seen to be actively crawling about. This is a slow process, for the four short legs situated close to the head have a long inert body to drag after them. Still, by desperate scrambling an energetic mite can cover an inch in ten minutes or so. It is seldom, however, that such steady and uninterrupted progress is attempted, but the crawling motion is varied by a very extraordinary performance. The mites possess, at the hinder end of the body, a muscular disc, surmounted by two rather stiff curved bristles. At frequent intervals they rear themselves up on this tail-disc, and stand upright, feebly waving their legs in the air. Many mites may be seen thus standing up, like so many skittles, on the surface of the bud which they are on the point of leaving.

The object of these antics is at first by no means obvious, but a few experiments make their purpose sufficiently clear. When touched with a needle-point while in this attitude they immediately let go their hold of the bud and are carried off on the needle. If touched with a camel's-hair brush, numbers are carried away wriggling in between the hairs. These objects are far too thick for the mites to grasp, but the creatures are covered by some adhesive matter which attaches them to any object by which they are touched, and they soon secure a firmer hold by coiling themselves, worm-like, round the hairs, and bringing their tail discs into play.



F.G. 2.—A, portion of bud, with mites crawling and standing erect.—B, erect mite more highly magnified.

But needles and camel's-hair brushes are hardly the most likely objects to present themselves to the expectant mites in the course of nature. If they are indeed feeling about blindly in the hope of coming into contact with some object to which they may attach themselves, what is most likely to fulfil their expectations? Clearly some passing insect or arachnid.

The matter is soon put to the test. Spiders, mites, and ants are induced to run over the infested buds. Flying insects which are observed to alight on the buds are caught and subjected to microscopic examination. In almost every case mites are found clinging to the hairs on the legs or bodies of the insects. We can hardly doubt, therefore, that this habit of rearing themselves upright and waving their legs in the air has been acquired for the definite purpose of obtaining the aid of passing insects in the accomplishment of journeys far beyond the reach of their own limited powers of locomotion. From bush to bush, down one stem, across rugged ground, and up another stem, would be a prodigious and impossible journey for a crawling mite. But an aërial journey for a considerable distance is quite a simple matter. It amuses the mite and does not hurt the fly.

Since any passing creature is seized indiscriminately, it is a mere accident if the mite reaches a destination which is of the slightest use to it. Myriads of those that are thus borne away must be carried far from their food plant and perish of starvation. Only those lucky individuals which are taken to other black-currant bushes have a chance of survival, and in their case ultimate safety is by no means assured. It is obvious that some insects will serve the purpose of the mite far better than others. An insect which casually alights on the plant may not chance to visit another black currant bush at all, or at all events not until after a long interval. On the other hand some insects confine their attention to this particular plant, and it is by these, no doubt, that the mite is principally distributed. Perhaps the best example is the currant *Aphis* or green-fly, which is almost sure to be present to some extent. The aphides crawl along slowly, feeling their way with their antennæ, as a blind man taps the ground in front of him with a stick. When these insects were examined after passing over an infested bud, during the migration period, mites were certain to be found clinging to their antennæ. Now certain individuals of the green-fly are winged, their function being to spread abroad the aphis attack, and in doing this they doubtless also distribute the mite. The problem of the distribution of creatures by no means gifted with effective organs of locomotion is therefore solved.

Another curious phenonenon remains to be described. The upright position would often be maintained by a mite for five minutes or more, consecutively. Then, apparently despairing of outside aid, it would generally continue its crawling motion, rearing itself on end again a little farther on. But sometimes the mite under examination would suddenly disappear, so quickly as at first to completely baffle the attempt to see what had become of it. After this had occurred several times, the creature was, so to speak, caught in the act, and it was seen to have the power of projecting itself endwise, like a rocket, apparently by the instrumentality of the tail disc above mentioned. To be sure, no great distance was accomplished by the leap, though it sometimes measured sixteen times the length of the mite, but it was at all events sufficient to carry it clear of the bud or stem on which it was standing, and to precipitate it to the ground or to some lower portion of the bush. The standing mites could always be induced to leap by blowing upon them, and it therefore seems as though they wait for a favourable puff of air to attempt this last and desperate method of departure. They may possibly hope by this means to attain an insect not near enough to brush against them but close enough to fan them with its wings.

At all events, they clearly have three modes of departure—by crawling, by leaping, and by attaching themselves to insects; and we are now confronted by the most difficult, and at the same time the most important, problem of their life-history—the question of their immediate destination. Subsequent events show that some of them, though a very small minority, reach the new buds which have just begun to develop, and the manner in which, and the extent to which this is accomplished, will be presently described. Of the vast majority, which are not so fortunate, three things are conceivable. Either they all perish, or they take refuge in the ground, and, possibly, lay eggs there which shall give rise to future generations; or they find a temporary shelter under loose bark, and there wait for happier times. It is most important to test this second possibility, for it has been tacitly accepted that the ground beneath infested bushes is capable of spreading the disease, and dressing it with gas-lime is commonly recommended as an important supplement to the pruning and washing measures adopted with regard to the plant itself. Now it is true that negative evidence can never be conclusive, but the most careful observations have failed to discover anything but a more or less speedy death to occur to those mites which reach the ground.

Ordinary soil under the microscope presents eminences and chasms, over and into which it is impossible to follow so minute a creature as the gall mite. It is sufficiently difficult with especially smoothed and flattened mould, but over this the mites have been traced for hours in the hope of finding some indication that they have reached an environment congenial to them. Sometimes on wet earth, and sometimes on dry, their behaviour has been closely watched, in the hope that they may be detected in concealing themselves in convenient crannies or, at all events, in depositing eggs. In no case was such an act observed. The mites wandered aimlessly, sometimes crawling, at others rearing themselves on the tail disc as though as far as ever from their real destination. They continued this restless behaviour for two or three days, and eventually died. If they do, indeed, in any sense make themselves at home in the ground, I have been unfortunate in finding no trace of the fact. I am strongly of opinion that those mites which reach the ground simply die there, unless they can very speedily crawl up another stem, or are lucky enough to be rescued from their perilous position by passing insects. If this is true, the desperate nature of the leap into space becomes at once apparent.

No greater success attended all attempts to detect the mites concealing themselves under loose bark or in cracks on the stem, nor would they have anything to do with the roots of the plant when placed upon them.

Meanwhile, strict watch was being kept upon the buds now developing to provide next year's foliage. At the end of May they were easily visible in the axils of the leaves, and, though quite small, were beginning to swell.

In the first week of June mites were observed outside these buds, in the leaf axils, and on June 7 a mite was seen to work its way into a bud, wriggling in between the sheathing leaves.

Almost daily during June a number of new buds were removed from infested bushes and examined under the microscope for mites —a procedure somewhat akin to the proverbial search for a needle in a haystack. They were first found on June 8, and from that date onwards they occurred in an increasing number of buds. A matter for some surprise was that they were always found near the middle of the bud, the closely wrapped leaves of which must present great obstacles to the entry of the mite. As a rule, one or two mites only were found in each bud, and these were mature animals, within whose bodies eggs were clearly visible. The frequent examination of buds was continued with the object of detecting the first signs of multiplication of the mites within them, and eggs and larvæ were first found on June 26. Hereafter the increase was rapid, mites in all stages being found within the buds, gradually extending from the centre outwards, until by the end of

July some of the creatures were only concealed by the loose external leaves.

The rapid increase of the mites within the new buds during June and July suggested that a second migration period was at hand in the autumn, but this was watched for in vain. Rare cases of external mites were observed, but there was no sign of a general exodus. Whether any wandering takes place at this time, no doubt, depends on the severity of the attack, and the mites are in no sense turned out of the buds because they are unfit for habitation, but a few may sometimes be crowded out by the multitude of their fellows. The attack under special observation was a very severe one, but even in this case very few autumnal wanderers were seen, nor was there any further striking incident to record. The diseased buds were much swollen in October, but were still fresh and green and full of mites snugly sheltered from the inclemencies of the coming winter.

The red-currant plant is not usually considered to be subject to the attack of the gall-mite, and certainly no complaints are ever made of its devastations. Nevertheless, it is liable to the disease in a modified form when in the neighbourhood of badly infested black-currant plants. In the course of the present investigation, red-currant plants were frequently examined, and for a long time the absence of any of the typical swollen buds seemed to indicate freedom from the disease. At the end of July, however, several of the mites were noticed at the base of the young buds in the leaf axils. It was thought at first that they might be casual wanderers from the black-currant bushes close at hand, but the presence of eggs and larvæ soon showed that they were tolerably at home in their present quarters, and could live and multiply there.

In one respect the attack was remarkably different from that on the black currants. The mites did not immediately proceed to the centre of the bud, and thence gradually spread outwards, but they settled down on the outside, and, as they multiplied, some of the brood crept into the bud and the attack spread centripetally.

The importance of this observation does not lie in the danger to the red currants, which never seem to suffer much, and which were in no instance found to be diseased unless in the neighbourhood of badly infested black-currant bushes. But the red currant can no longer be entirely overlooked in the problem of eliminating the disease. Indeed the intermixture of red and black currant plants sometimes recommended would seem to be undesirable, because the different behaviour of the mite on the red currant introduces an element of uncertainty, the mite being external on that plant long after the migration period has ceased on the black currant.

During the investigation a constant look-out was kept for any natural enemies of the mite, but the result was not very encouraging. Two other and larger species of Acari were frequently found in and upon the diseased buds, and may do something to keep the pest in check. The greatest hope was entertained of the maggot of a Cecidomyid fly, which was found in a large proportion of the infested buds, and which was proved to be living on the mites. The selfish policy of this creature, however, renders it of little use to the fruit-grower, for instead of clearing out the pest from one bud and proceeding to another it feeds with such extreme moderation that the mites keep pace with its ravages by their wonderful powers of reproduction. The consequence is that the grub develops with extreme slowness, and is not much larger in October than it was in July, so that its rearing and identification have not yet been possible. It may still be of more service than would appear, for during the winter the increase of the mites slackens off considerably, and before the flies emerge, as they probably will next spring, their grubs may have reduced the number of buds from which the new attack can arise by devouring all their inmates.

Briefly stated, the life-history of the black-currant gall-mite seems to be this. Buds containing the mite survive the winter. They are either so slightly diseased that they develop and turn out the mites which, finding no proper haven, quickly perish, or they are entirely abortive, and remain on the stems till they dry up in June. As they wither the mites are driven forth, and of the myriads which seek distribution by crawling, leaping, and attaching themselves to insects an insignificant number reach the new buds, the rest all perishing.

The lucky few are, however, quite sufficient to set up the new attack, and increase with phenomenal rapidity within the new buds during July and August, after which time their rate of multiplication diminishes. The diseased buds, swollen and distorted, remain on the bushes during the winter together with those which have escaped infestation.

The immediate object of this investigation was the elucidation of the life-history of the mite. If the results may be accepted—and it is highly desirable that they should be confirmed by other observers—certain items in the treatment usually recommended for the disease may be discontinued as useless. Fruit-growers are frequently advised to remove the surface soil, or apply a dressing of gas-lime beneath the bushes. But, if we are correct in the view that nothing comes of those mites which remain on the ground, all this is so much waste labour and expense.

Again, spraying or washing with paraffin emulsion is either vaguely recommended without specifying a time, or different dates are proposed by different economic entomologists.

From the conclusions here arrived at, it would seem to be unnecessary to spray in the early spring, since the mites, then wandering, will die without our intervention, and in the late summer and autumn the wanderers are so few that the game would not be worth the candle.

If washing be resorted to, the time indicated would be from the middle of May to the middle of June (judging by the past year), and this is just the period when there are difficulties with regard to the blossom, so that washing at any time is of doubtful value.

There is one brief period in the life-cycle of the mite which seems to me to possess peculiar interest, whether or not any practical use can be made of it. This is, or was in the past year, the last week in June, when the mites are reduced to a minimum. A fortnight previously they were present in myriads, and a fortnight later they swarmed again. At this time, of all the countless hosts of mites on the move early in June, only an infinitesimal number, perhaps an average of two or three in each of such of the new buds as had acquired the disease, survived, and these had as yet hardly begun to multiply. Drastic measures at this time would seem to have a much greater chance of success than when the mites are present in thousands. What would be the best line of action it is difficult to say. The removal of all the new wood bearing next year's buds ought, practically, to remove the whole of the attack, but it is quite likely that this suggestion will be condemned as impracticable, and too destructive of next year's crop. Yet a trial might be given to it, preferably in the case of a small clump of infested bushes far removed from other diseased plants, so that the experiment should not be vitiated by re-infestation. All the new shoots should be carefully cut off in the last week in June and burned. It would be found that the plant would still manage to put forth new buds, and these ought to be free from the mite. The next year's crop would certainly suffer, and the operation would be tedious, but there are severe cases where it would be worth trying.

The old-fashioned measure of hand-picking the diseased buds in the winter would still appear to be one of the best means of keeping the attack in check. It is of the highest importance, in striking new plants, to select cuttings from bushes free from disease.

THE CLOVER SEED WEEVIL.

Apion apricans, Herbst.

A great deal of clover seed has been lost this year by the depredations of the little pear-shaped weevil which lays its eggs in the developing blossoms, and the larvæ of which feed on the seed and cause the heads to turn the familiar rusty brown colour. If the injured heads are pulled to pieces, the little white fleshy grubs will be readily found feeding within them. This is an attack for which there is no remedy, for the harm is completed when the disease is first recognised, and the only thing to be done is to deal with the crop in such a manner that as few weevils as possible shall escape to renew the attack.

Where the weevil is observed, therefore, it is important to cut the clover early, and not allow it to run to seed. When infested clover is allowed to run to seed, attention should be paid to the refuse from thrashing, which is certain to contain a large number of the grubs and weevils. Any measures ensuring their destruction at this time would diminish the probability of future attack.

FRIT-FLY IN OATS.

Oscinis frit, L.

The Frit-fly is one of the corn pests about which complaints are annually received. It was briefly treated in last year's report of the Zoologist among the insects injurious to oats.

In this country the only attack which has been recorded is that which occurs in June, on the young plant, on which the small maggots feed just above the root. In Sweden, however, it first attracted attention by the devastation wrought by a later brood upon the ears of barley, and indeed the withered ears, known as "frits," gave rise to the name by which the fly is generally known. This year, for the first time as far as I am aware, this later attack occurred in England, some oats sent on July 15 having all the appearance of this infestation, and the grains containing some of the characteristic chrysalids.

No remedial measures, of course, would be possible in the case of this late attack, but it might be worth while to ensure the destruction of the chrysalids which would no doubt be found in large numbers in the cavings when the oats were thrashed.

The importance of early sowing as a preventive against the June attack was emphasised this year in a letter from a Lancashire correspondent, who remarked that all the late-sown crops in his district suffered severely. Of course it is not always possible to sow early, but where it can be accomplished it is most important.

THE DIAMOND-BACK MOTH.

Plutella cruciferarum, Zell.

The Diamond-back moth has this summer been very destructive to turnip crops in Northumberland and Durham. This is one of those insects which, while always present to some degree, appears at intervals in such enormous numbers as to become a very formidable pest. Moreover, its operations are so rapid that the farmer, if not alive to the danger, may have the entire leafage of a turnip crop destroyed in two or three days. It is not at all unlikely that it will next year be rare in those districts which suffered so much during the past season, for its periodical increase is generally accompanied by an even greater increase in the parasites that prey upon it. Yet when it does appear it is so serious an enemy that it is very desirable that its presence should be at once recognised and prompt action taken. If small grey or green caterpillars, not exceeding about half an inch in length, are observed feeding on the leaves of swedes, turnips, or cabbages during July or August, this moth should be suspected.

The caterpillar wrought great havoc in the summer of 1891, and the Board of Agriculture instituted an inquiry into the matter, and experiments were made with a view of determining the best method of treatment. The greatest success attended a dressing of soot and lime—one part of lime to three of soot—distributed at the rate of about four bushels per acre. To make it thoroughly effective some kind of distributing machine should be used, so that it may be applied with a certain amount of force and uniformity, and may reach the under side of the leaves as far as possible.

CARROT FLY.

Psila rosæ, Fab.

The carrot disease known as "rust," and due to the grub of the carrot fly, is one about which some complaints are annually received. This year the attack was particularly early, very young diseased plants being received at the end of June.

The attack nearly always declares itself after thinning, and it may be warded off with proper care. A correspondent reports an experience which is worth recording in this connection. After thinning out the smaller plants—care being taken to remove all fragments—and burying them deep in the compost heap, he is in the habit of immediately dusting over the rows a finely ground mixture of nitrate of soda, sulphate of soda, sulphate of ammonia and superphosphate. This treatment was followed with the greater part of the crop, and resulted in a thoroughly sound and vigorous growth, but on a small patch where the dusting was accidentally omitted the fly was exceedingly destructive.

Dry weather favours the attack, partly because it renders the roots liable to become exposed, and the bruising incidental to the operation of thinning seems to attract the fly. The danger is reduced if they are thinned when quite young, and care should be taken to earth the roots up well after this process.

FOREST AND FRUIT TREE PESTS.

For some reason or other tree-destroying insects seem to have been much more in evidence than usual during the past year. Though some of the insects sent for identification were present as the result and not the cause of decay, yet the unusual number of applications for advice with regard to wood-boring pests indicates that the unsatisfactory condition of certain foliage trees has attracted considerable attention throughout the country. The beech tree is a good example. These trees are extensively dying in some parts of the country, and no sufficient cause has been discovered. For the last two or three years their decline has been frequently reported, and I have often received portions of the bark covered with the white mass due to the beech scale insect, *Cryptococcus fagi*. I can find no evidence that this is in any way the cause of decline, and I believe it to be merely a symptom of decay. It never makes any headway on sound and vigorous trees, and it is only when a beech is obviously falling into decay that the white patches spread extensively over the bark.

The causes which influence the health of this tree are by no means understood. It has been observed that it is particularly susceptible after an unusual output of "mast" such as occasionally occurs, and such as was observed during 1900. During the past summer it suffered in some districts from an unprecedented attack of the beech weevil, *Orchestes fagi*, which entirely defoliated some of the trees in the New Forest and elsewhere. Such an attack upon trees already enfeebled might easily have the worst consequences.

A member of the Society reports another mysterious case of tree failure. Of about thirty-five pear trees, averaging ten inches in diameter, growing in "made-up soil upon river gravel," twenty-six "died off" suddenly in the late summer. Here the wood was bored by the larvæ of a small beetle (*Xyleborus*) of which Fowler, in his "British Coleoptera," observes that it attacks decaying trees of various species. Indeed in view of the very extensive wood destruction by such pests as the goat-moth caterpillar which a tree can stand without fatal results, the comparatively slight borings of the beetle seemed quite inadequate to explain the death of the trees, though at an earlier stage of the attack some damage may have been caused by the loosening of the bark.

Some of the tree pests inquired about possess a special interest, and will be separately noticed, but almost all the more familiar attacks were reported. In fir plantations both the pine beetle (*Hylesinus piniperda*) and the pine weevil (*Hylobius abietis*) were complained of. Specimens of fir-wood were also sent, perforated with large borings, together with some of the grubs found within the tunnels. The large wood-wasp, *Sirex*, was here at work, but it was interesting to find that the grubs were not those of that insect, but of the great Ichneumon-fly (*Rhyssa persuasoria*) which is parasitic upon it.

Goat-moth caterpillars were sent from a variety of trees, especially willows, on which also the white scale (*Chionaspis salicis*) was also the subject of inquiry. Two cases of wood-boring in pear trees were recognised as due to the leopard moth (*Zeuzera æsculi*).

Among these numerous tree pests four have been brought under my notice for the first time, and therefore call for somewhat fuller mention.

Cryphalus tiliæ in Lime Trees.

In April some injured lime branches were sent with a request for the identification of the insect at work and advice as to treatment. The injury was recognised as the work of a beetle known scientifically as *Cryphalus tiliæ*, whose borings are very characteristic.

Fowler gives the Forest of Dean and the neighbourhood of Lincoln as the English localities for this beetle. The trees infested in the present case were near Loughborough.

Lime branch, showing the work of *Cryphalus tiliæ*.

The insect does not attack the trunk or the main branches, but it plays such havoc with the soft bark of the smaller branches, about two or three inches in diameter, that the bark strips off and they are killed, giving the tree a very unsightly appearance.

Beyond the removal, as far as possible, of infested boughs, the plan might be tried of laying down branches in March to entice the beetles to lay their eggs in them, and then removing and burning them in May.

THE SMALL WOOD WASP (*Xiphydria dromedarius*) IN WILLOW TREES.

Two large wood-wasps, the Giant Sirex (*S. gigas*) and the Blue Sirex (*S. juvencus*), are of common occurrence in fir wood. *Xiphydria dromedarius* is an allied insect, belonging to the Siricidæ, but it is seldom met with, and I do not find any mention of its occurrence for the past twelve years, nor for some years previous to that date. Willows were found attacked by this insect a few miles from Cambridge in April last; the wood was deeply burrowed in all directions, and full of the larvæ. The insects began to emerge in June, and considerable numbers of them were bred out during that month.

A BEETLE MITE ON LIME TREES.

Oribata orbicularis.

On three occasions during the past summer my attention was called to an infestation of which no account could be found in any of the works on economic entomology. In each case young trees —generally, but not invariably, lime trees—presented a diseased appearance with regard to some of their branches. Examination of these branches showed masses of minute glassy objects crowded together, just below the point of origin of the branch. Microscopic examination showed them to belong to the Oribatidæ or "Beetle Mites," and the species appeared to be *Oribata orbicularis*. This is a common acarine, and it is rather strange that it has attracted so little attention, for in the cases here recorded there was every appearance of its having a distinctly deleterious effect upon the infested branches, and one correspondent attributes "large bare scabs a foot long" on the bark to its instrumentality.

It was pretty satisfactorily cleared off by scrubbing with an emulsion of paraffin and soft soap. There is always the possibility that creatures found associated with a diseased condition of a plant are symptoms and not the cause of the disease, but appearances were certainly against the mite, and it will be as well to watch for similar cases in the future.

THE ACORN GALL-WASP ON THE CORK OAK.

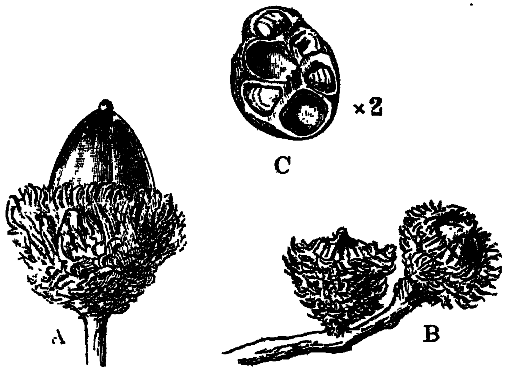
Andricus glandium.

My attention was called in October to a Cork oak (*Quercus suber*) at Cambridge, of which practically the whole acorn crop had been destroyed, the ground being littered with the injured acorns, and it was stated that a similar condition of things had been noticed for some years past.

Every acorn contained a varying number of white fleshy grubs, each in its own small compartment. The grubs had devoured the whole of the soft interior, only hard partition walls separating the chambers of the various larvæ.

The grubs were apparently those of a gall-wasp, known scientifically as *Andricus glandium.* Cameron, in his "British Phytophagous Hymenoptera," gives the Botanical Gardens at Kew as the only British locality for this insect, so that it would appear to be spreading from that centre. Moreover, the Turkey oak, *Q. cerris*, has been the tree hitherto infested.

The Cynipidæ or gall-wasps are amongst the most remarkable insects as regards their manner of life. They frequently exhibit the phenomenon of alternate generations—one generation entirely of females giving rise to another in which males and females are found—and often the galls formed by the different generations are not in the least alike.



A, normal acorn of *Quercus suber.*—B, infested acorns.—C, acorn dissected to show the chambers containing the larvæ of *A. glandium.*

The acorn galls are caused by the entirely female or "agamic" generations of *Andricus glandium.* The bi-sexual generation has been described by Mayr, but no account is given of the gall formed by it.

The injured acorns fall to the ground and lie there for a long time with the grubs within them. Indeed, when an attempt is made to breed the fly from them, the insect usually does not emerge for two or three years. The obvious method of treatment is the removal and destruction of the fallen acorns, from which, sooner or later, succeeding attacks must spring.

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THE WOBURN FIELD AND FEEDING EXPERIMENTS.

PAGE

I. FIELD EXPERIMENTS, 1899 AND 1900 272
  CONTINUOUS GROWING OF WHEAT 272
  CONTINUOUS GROWING OF BARLEY 279
  ROTATION EXPERIMENTS (STACKYARD FIELD) 286
  ROTATION EXPERIMENTS (LANSOME FIELD) 290
  GREEN-MANURING EXPERIMENT 290
  VARIETIES OF BARLEY AND KILN-DRYING OF BARLEY . . 294
  LUCERNE 294
  SAINFOIN 296
  LA THYRS SYLVESTRIS 296
  EXPERIMENTS ON PASTURE 297
  GORSE 298
  PREVENTION OF POTATO DISEASE 298
  "FINGER-AND-TOE" IN TURNIPS 298
  RAINFALL AT WOBURN FARM IN 1899 AND 1900 . . . 299
II. VALUE OF CONDIMENTS IN THE FEEDING OF BULLOCKS 299
III. EARLY FEEDING OF MANGELS TO SHEEP; AND GORSE AS A FOOD FOR SHEEP 308

I. FIELD EXPERIMENTS, 1899 AND 1900.

THE last published account of the Woburn Field Experiments is that for the year 1898, and will be found in the Volume for 1899, pp. 585–607. The present report continues the account, and embraces the experiments of 1899 and 1900, completing the results to the end of the year 1900.

CONTINUOUS GROWING OF WHEAT (*STACKYARD FIELD*).

1899 (23RD SEASON).

The land, after removal of the 1898 crop, was scuffled on September 4, 1898, and ploughed on October 10. Sampling of the soil of certain plots (Nos. 1, 2, 4, and 5) was begun on October 5, this being the first sampling since 1888. Sowing was done on November 4, "White-chaffed Browick" wheat being drilled in at the rate of 9 pecks per acre. This was a change from "Stand Up," the wheat grown on this land the year before. Mineral manures, owing to windy weather, could not be put on plots 4, 5, 6, 8, and 9 until November 22, by which time the wheat was up. The wheat seemed most backward on plots 2, 5, 8, on all of which ammonia salts had been used. The winter was a mild one to March, but March was exceedingly bleak and cold. Farmyard manure—made during the winter by bullocks, in boxes, consuming definite quantities of decorticated cotton cake, maize, roots, chaff, &c., with wheat straw given as litter (the whole being calculated to yield ammonia 200 lb. per acre)—was spread on plot 11b on March 10. Rape dust—giving nitrogen equal

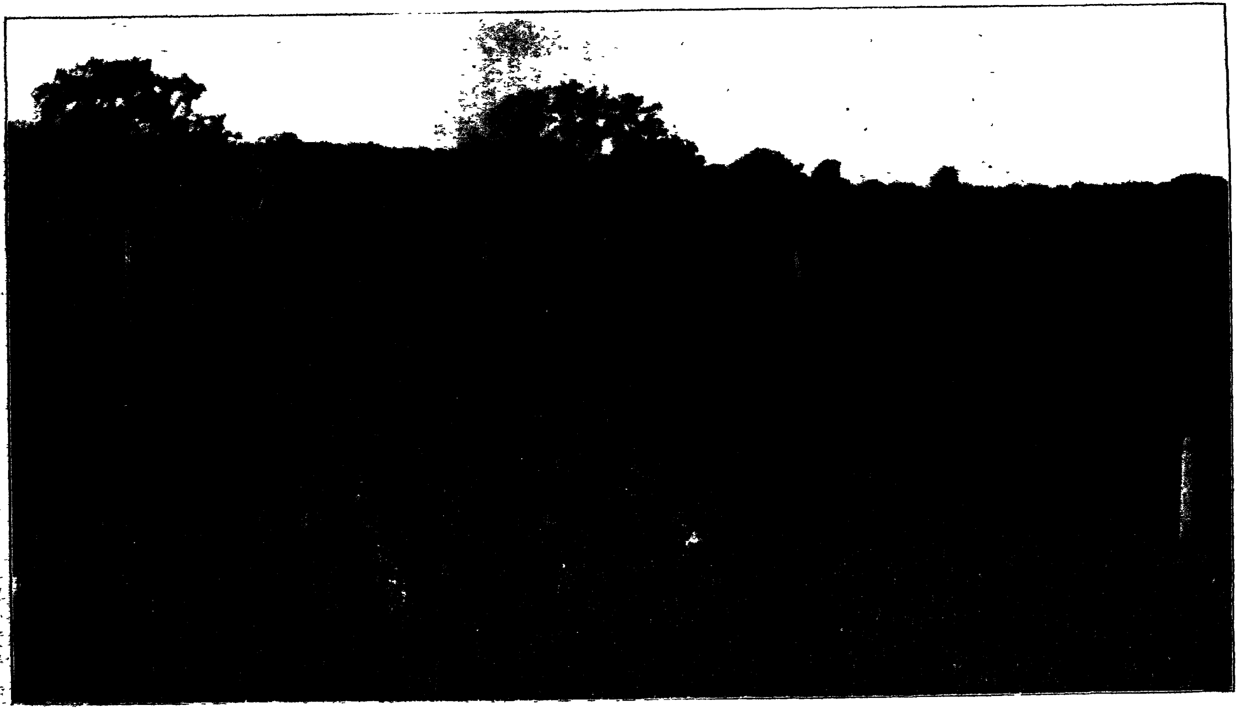

FIG. 1.—View of plots 2a and 2b at end of May 1899. Wheat manured with ammonia salts since 1877. 2a (in centre), ammonia salts only. 2b (on right), ammonia salts with single application of 2 tons lime per acre in December 1897. In foreground plot 5 ammonia salts with mineral manures.

to 100 lb. ammonia per acre—was spread on plot 10b on March 17. As usual, the dung showed the earliest effect, but the rape dust caught it up after a short time. Plot 2a (ammonia salts alone, and unlimed) went off just as it had done in recent years, the soil appearing of a lighter colour and the land being much infested with spurry. Transplanting was tried on the worst parts of the plot. Meanwhile the limed half (2b) of this plot remained quite good.

Up to this year the nitrogenous top-dressings had been put on in one single application, both light and heavy dressings. The propriety of dividing the heavier dressings into two different applications had been discussed frequently, and the fact that the dressings were applied, as a rule, rather late, and that a residue was left from the ammonia salts, suggested that this might be due to the late time of application. Accordingly, it was decided to make an alteration, and, in the case of the heavy dressings (plots 8a and 9a), to put them on in two separate applications. This was done, one-half the full dressing being put on these plots on April 3, and the second half on May 5; on this latter date the single applications were also put on plots 2 and 5 (ammonia salts) and 3 and 6 (nitrate of soda). It being a dry year, it was expected that nitrate of soda would do better than ammonia salts, and appearances certainly seemed to bear this out. The rape-dust plot (10b) looked also decidedly better than the farmyard manure plot (11b). The differences between the two halves of plot 2 (ammonia salts) were very remarkable, and are well shown in Fig. 1 on page 273.

It will be seen that on the unlimed plots, in the centre of the picture, the wheat plant had gone off very considerably, the failure commencing immediately at the path dividing this plot from plot 5 (in the foreground). On the other hand, the half (2b) to which lime had been applied was quite restored, and a fair plant was observable all over it. This difference, it will be seen, was borne out in the produce, 2b giving fully 10 bushels more corn per acre than 2a.

The rape-dust plot (10b) was one of the best-looking of the series. The difference between 10b (where rape dust was put on) and 10a (where rape dust, after being put on for some years, was left off after 1889) is very clearly brought out in Fig. 2 on page 275.

The weather continued dry until harvest and right through that period. The wheat was cut on August 10, carted and stacked on August 16, and threshed on November 24. The corn, after being dressed and weighed, was valued on March 7, 1900. The results are given in Table I. on page 276.

The general produce of corn was below the average of the past twenty-years and less than the crop of 1898. The unmanured crop (1 and 7) was 9½ bushels against 14 bushels in 1898. With minerals only (4) the yield was very low, but this was due in a measure to the influence of trees, this having been noted before. The differences between 2a and 2b, which appeared so clearly during the growth of the crops, was fully borne out at harvest, for plot 2b gave 10 bushels more corn and 6 cwt. more straw, the increase in 1898 (the first crop after application of lime) having been 4 bushels of corn only. The produce of ammonia salts with lime was now equal to that of nitrate of soda alone, and it was also the same as with ammonia salts and minerals (plot 6). Higher produce, both in corn and straw, was obtained from the nitrate plots (3, 6, 9) than from the corresponding ammonia salts plots (2, 5, 8) the highest produce of all (41 bushels of corn and 43 cwt. of straw) being obtained on plot 9a, where the double dressing of nitrate of soda together with minerals was applied. It is noticeable, however, that while the omission of nitrate of soda (9b) for the single year caused a reduction of 31 bushels of corn and gave a crop only very slightly exceeding the unmanured produce, the corresponding omission of ammonia salts (8b) only brought about a reduction of 13 bushels, giving still a crop of 20·3 bushels, or more than 10 bushels in excess of the unmanured produce. It is rather difficult to say whether the application of the top-dressings of ammonia salts and nitrate of soda in two lots instead of in a single dose had any favourable influence or not. The produce with nitrate of soda was certainly more than in 1898, but, on the other hand, by far the higher produce was that year obtained by putting on ammonia salts in one single application. Rape dust gave—as the appearance of the plots seemed to indicate it would—a better return than farmyard manure, and in each case the residue of previous applications of these more slowly acting manures showed

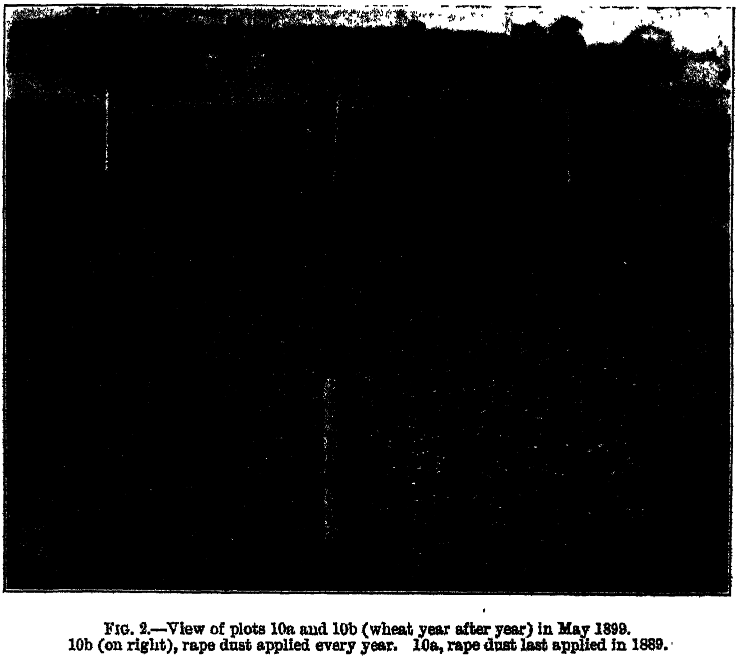

FIG. 2.—View of plots 10a and 10b (wheat year after year) in May 1899.
10b (on right), rape dust applied every year. 10a, rape dust last applied in 1889.

still some effect, and gave crops in excess of the unmanured produce.

TABLE I.—*Continuous Growing of Wheat*, 1899 (23*rd Season*).

(Wheat grown year after year, on the same land, the manures being applied every year.)

Stackyard Field—Produce per acre.

Plot	Manures per acre	Head corn			Tail corn	Straw, chaff, &c.			Value per quarter on basis of 27*s*.		Remarks
		Wght.	No. of bush.	Wgt. per bush.	Weight						
		lb.		lb.	lb.	c.	q.	lb.	*s.*	*d.*	
1	Unmanured	602	10·3	58·5	17	10	1	14	26	0	Lot of thin corn, looks blighted or cut green
2a	[1] Ammonia salts (containing 50 lb. ammonia) . .	1,183	19·1	61·9	34	15	1	21	26	9	Good strong corn, well-grown; more bloom than 2b
2b	Ammonia salts (containing 50 lb. ammonia), with 2 tons lime December 1897 .	1,766	29·0	60·9	24	21	1	11	26	6	Stronger than 10b
3	Nitrate of soda (containing nitrogen = 50 lb. ammonia)	1,654	29·3	56·4	64	29	1	2	25	0	Much the worst sample of the whole set
4	[2] Mixed mineral manures (sulphates of potash, soda, and magnesia, with superphosphate) . . .	412	6·9	60·0	14	7	3	16	26	9	Not so strong as 2a, but almost equal in quality
5	Mixed mineral manures and ammonia salts (containing 50 lb. ammonia) . .	1,809	28·5	63·5	22	23	2	4	27	6	Not so strong as 8a. Well grown and free from dross
6	Mixed mineral manures and nitrate of soda (containing nitrogen = 50 lb. ammonia)	1,860	31·2	59·7	42	31	3	26	26	0	Better than No. 1. Much stronger corn
7	Unmanured	527	8·6	61·6	12	8	0	4	26	0	Better than No. 1
8a	Mineral manures and (in alternate years, 1899 included) ammonia salts (= 100 lb. ammonia)	2,386	33·1	63·1	18	27	1	2	28	0	Good strong sample, well grown, and stronger than any other, very free from tail corn
8b	Mineral manures, ammonia salts (= 100 lb. ammonia) omitted (in alternate years, including 1899) . .	1,278	20·3	63·0	10	16	3	25	26	6	Well grown, but not strong; equal to 11b, but of different type
9a	Mineral manures and (in alternate years, 1899 included) nitrate of soda (containing nitrogen = 100 lb. ammonia)	2,480	41·0	60·8	38	43	0	16	27	0	Good sample, not quite so good as 9b, not so heavy as 8a
9b	Mineral manures, nitrate of soda (containing nitrogen = 100 lb. ammonia) omitted (in alternate years, including '99)	595	9·8	60·7	14	10	1	17	27	0	Not very different from 9a; a little better, more bloom
10a	1889, rape cake (= 50 lb. ammonia). No manure since	913	14·8	61·5	16	12	2	8	26	0	
10b	Rapecake (= 100 lb. ammonia) every year since 1890 .	1,784	29·2	61·0	28	27	1	13	26	0	Very little different from 2a
11a	1877–81, farmyard manure (= 200 lb. ammonia). No manure since . . .	787	12·9	61·2	20	11	3	6	26	6	Better grown than 11b
11b	Farmyard manure (= 200 lb. ammonia) every year .	1,232	20·8	59·2	28	25	0	24	26	6	Stronger than 11a, but more thin corn; equal to 8b, but of different type

[1] Ammonia salts are equal weights of sulphate of ammonia and muriate of ammonia.

[2] Mixed mineral manures are, throughout, 3½ cwt. superphosphate of lime, 200 lb. sulphate of potash, 100 lb. sulphate of soda, 100 lb. sulphate of magnesia per acre.

As regards the quality of the corn, the values were reckoned on a basis of 27*s*. per quarter of wheat weighing 63 lb. per bushel.

The valuers regarded the samples, as a whole, as being of fair average, rather lower than in 1898. The most notable features were that the best samples were those produced on plots 8 and 5 (ammonia salts with minerals), these giving also the highest weight per bushel. By contrast, the lowest weight per bushel and the largest amounts of tail corn were given on plots 3, 6, and 9, on each of which nitrate of soda had been used. The worst plot of all was plot 3, on which nitrate of soda had been used alone.

1900 (24TH SEASON).

The details of cultivation were very similar to those in 1899, and need not be here repeated at length. The variety of wheat sown was again "White-chaffed Browick," drilled in on October 25, 1899.

The first notable appearance was the failure of the wheat plant on the unlimed half (2a) of plot 2 (ammonia salts alone). This was shown the previous year (see fig. 1, page 273), and now the failure of crop was still further marked. Transplanting was tried, but produced little effect. Farmyard manure (11b) and rape dust (10b) were put on as top-dressings on March 8 and 12, 1900, respectively. Top-dressings of nitrogenous salts were applied, the heavy dressings (8b and 9b) going on, as in 1899, in two lots—the first on April 17, the second on May 2, on which latter date the single applications to plots 2, 3, 5, and 6 were also made. Early in April there were heavy gales, and a severe frost (11 degrees on April 26) made the wheat look worse. The wheat came into ear about the middle of June, and, as harvest approached, the farmyard manure and nitrate of soda plots seemed to be ripening the quickest. Bad weather early in August delayed the cutting, but this commenced on August 13, and the crop was carried by August 29. Subsequently the corn was threshed and valued. The results are given in Table II. on page 278.

The general produce was very low, the unmanured plots only giving 8 bushels per acre, against 9½ bushels in 1899 and 14 bushels in 1898. The highest yield (9b) was 27·7 bushels, against 41 bushels in 1899 and 54 bushels in 1898. On the ammonia salts plots the addition of lime (December 1897) gave an extra return of 5 bushels (2b), the crop being 2½ bushels in excess of that with nitrate of soda only (plot 3). There was no marked difference this year, as regards the weight of corn, between ammonia salts and nitrate of soda; but the same differences as in 1899 and former years were shown when these respective salts were omitted for a single year (8a and 9a), for, though the produce was 27 bushels when either salt was applied with minerals, the omission of ammonia salts brought the yield down to 16 bushels. The omission of nitrate of soda, however, caused it to be as low as 6·8 bushels, or below the unmanured produce. The exceptionally low yield of plot 4 (minerals only) is to be traced partly to the influence of trees. Rape dust (10b) once more did better than farmyard manure (11b), and a result was still shown (plots 10a, 11a) from the previous applications of these materials, now withheld.

TABLE II.—*Continuous Growing of Wheat*, 1900 (*24th Season*).

(Wheat grown year after year, on the same land, the manures being applied every year.)

Stackyard Field—Produce per acre.

Plot	Manures per acre	Head corn			Tail corn	Straw, chaff, &c.			Value per quarter on basis of 29*s.*		Remarks
		Wght.	No. of bush.	Wgt. per bush.	Weight						
		lb.		lb.	lb.	c.	q.	lb.	*s.*	*d.*	
1	Unmanured	478	8·0	59·7	19	7	2	13	28	6	Better than plot 2a; an excellent, well-grown wheat, a little damp
2a	[1] Ammonia salts (containing 50 lb. ammonia) . .	781	12·5	62·5	101	9	2	21	28	6	Stronger than plot 1, not so well grown
2b	Ammonia salts (containing 50 lb. ammonia), with 2 tons lime December 1897 .	1,049	17·8	58·7	54	13	0	9	27	9	Better than plot 1, containing a lot of thin corn
3	Nitrate of soda (containing nitrogen=50 lb. ammonia)	878	15·3	57·1	87	14	3	15	27	0	Poor corn. Worst sample of set
4	[2] Mixed mineral manures (sulphates of potash, soda, and magnesia, with superphosphate) . . .	356	5·9	60·5	26	6	2	12	28	0	Free from small corn and of even growth
5	Mixed mineral manures and ammonia salts (containing 50 lb. ammonia) . .	1,494	23·8	62·6	76	17	3	24	29	6	Better than plot 4; nearly as good as, and might be bracketed with, 8a; more bloom and stronger than plot 7
6	Mixed mineral manures and nitrate of soda (containing nitrogen=50 lb. ammonia)	1,355	22·5	60·2	44	20	0	6	27	6	
7	Unmanured	498	8·0	62·2	30	7	1	23	28	6	Well grown, but not so much gluten as plot 5, and contains a good deal of open wheat
8a	Mineral manures, ammonia salts (=100 lb. ammonia) omitted (in alternate years, including 1900) . .	1,014	16·2	62·5	46	13	0	11	30	0	Better than 8b, well grown, even, fairly strong, plenty of good corn, and free from shrivelled grains
8b	Mineral manures and (in alternate years, 1900 included) ammonia salts (=100 lb. ammonia)	1,686	27·3	61·6	40	22	1	6	28	0	Strong wheat, but contains many thin corns; a lot of open corn
9a	Mineral manures, nitrate of soda (containing nitrogen=100 lb. ammonia) omitted (in alternate years, including 1900)	434	6·8	64·0	38	6	1	22	28	0	Better than 9b, and more even than 8b
9b	Mineral manures and (in alternate years, 1900 included) nitrate of soda (containing nitrogen=100 lb. ammonia)	1,666	27·7	60·0	56	25	3	10	27	9	Stronger than 11b, not so many shrivelled corns
10a	1889, rape cake (=50 lb. ammonia). No manure since	639	10·2	62·5	36	9	3	9	28	0	Little more thin corn, not so even, more unripe grains than plot 4
10b	Rapecake (=100 lb. ammonia) every year since 1890 .	1,465	24·1	60·8	51	20	0	24	28	0	Hard to distinguish the difference between this and 11a
11a	1877–81, farmyard manure (=200 lb. ammonia). No manure since . . .	586	9·5	61·7	18	7	0	23	28	0	Better than 11b, little bloom
11b	Farmyard manure (=200 lb. ammonia) every year .	1,044	17·5	59·7	36	14	0	20	27	9	One of the weakest samples, no strength at all

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[1] Ammonia salts are equal weights of sulphate of ammonia and muriate of ammonia.

[2] Mixed mineral manures are, throughout, 3½ cwt. superphosphate of lime, 200 lb. sulphate of potash, 100 lb. sulphate of soda, 100 lb. sulphate of magnesia per acre.

In regard to quality, which was reckoned on a basis of 29*s.* per quarter for wheat weighing 63 lb. per bushel, it was stated by the valuers that the wheat was "not up to the average, but contained a lot of small corn, was deficient in strength, and lacked bloom." A singular feature was that the unmanured plots (1 and 7) stood nearly the highest. The actual best were, as in 1899, the ammonia salts plots, and about the worst the nitrate of soda ones (3, 6, and 9), the very worst sample of all being that from plot 3 (nitrate of soda only), this giving also the lowest weight per bushel. These results are in general confirmation of those obtained since the system of valuation was introduced in 1899.

CONTINUOUS GROWING OF BARLEY (*STACKYARD FIELD*).

1899 (23RD SEASON).

The land used in 1898 was scuffled twice in the autumn, and, in December 1898, samples of the soil were taken from plots 1, 2a, 4, 5a, 8a, and 8b, in order to investigate in the laboratory any changes that might have taken place in connection with the continuous application of ammonia salts. The land was ploughed in December, and a second time early in March. On March 17, 1899, 9 pecks per acre of "Archer's Stiff-straw" barley was drilled, this being a variety new to the land, "Golden Melon" having generally been sown before. Farmyard manure (made as described in the case of the wheat experiments) giving ammonia 200 lb. per acre, and rape dust giving nitrogen equal to 100 lb ammonia per acre, were applied as top-dressings on March 17. The barley came up about March 30, and mineral manures, which, owing to the prevalence of wind, could not be put on before, were applied to plots 4, 5, 6, 8, and 9 on April 14. The plots 2, 5, and 8, on which ammonia salts had been used since the commencement in 1877, presented quite a different appearance from the rest of the field, the soil seeming to be of a much lighter colour. As these plots ran in a line the whole length of the field the appearance was very striking. On 2a (unlimed) the barley came up a little, but died off almost at once; on 5a and 8a (also unlimed) it came up rather better, but also went off later on; while on the limed halves, 2b, 5b, and 8b, it not only came at first, but stayed throughout, the difference between the corresponding unlimed and limed plots being most remarkable, and affording a most clear demonstration of the fact that it is possible to exhaust land naturally poor in lime so thoroughly by the continued use of ammonia salts as to make it incapable of supporting a barley crop. Photographs illustrating these appearances were given in the account of the experiments for 1898 in the Volume for 1899, pp. 592, 593. Nitrogenous top-dressings were, for the first time, as for the wheat, applied in two lots in the case of the heavy dressings (8a, 9a), the first half being put on on May 5, and the second on May 17, on which latter date the salts were also given to plots 2, 3, 5, and 6.

By May 29 the greater part of the plant on plot 2a (ammonia salts and unlimed) had died off, and on 5a and 8a to a large extent also. Photographs of the plots were taken on that date, and fig. 3 on the opposite page shows very clearly the differences between the limed and unlimed portions.

The differences in appearance were fully maintained in the crops, as the results show. The barley looked uncommonly well until the middle of July, but then, owing to drought, it ripened prematurely and dried up. Hence the quality of the barley was poor. On August 15 the crop was reaped; it was carted on August 18, and threshed on November 22. The results are given in Table III. (p. 282).

The unmanured yield was 15 bushels, or below the average (21 bushels) of the twenty years; but, as a whole, on the manured plots the produce was rather above the average. Thus, the highest yield was 56·3 bushels (9a) with minerals and nitrate of soda (heavy dressing), while minerals and ammonia salts (heavy dressing) gave, after liming (plot 8aa), 49·2 bushels, both being above the average amounts for the land.

Mineral manures alone showed an increase of nearly 4 bushels over the unmanured plot, the plot in this case being free from the influence of trees. Nitrate of soda, in a dry season like the one under review, gave, as with wheat, higher results than ammonia salts, viz. 3 bushels more (2b and 3), 10 bushels more (5b and 6), and 7 bushels more (8aa and 9a); but where the nitrogenous dressings were left out for a single year the fall in produce was much greater with nitrate of soda than with ammonia salts, viz. 28 bushels (9a, 9b) against 11 bushels (8aa and 8bb). The most remarkable results, however, were those which followed on the ammonia salts plots from the single application of 2 tons per acre of lime in December 1897, and not repeated since. Thus, the lime accounted for an increase of no less than 25 bushels with ammonia salts alone (2a and 2b), of 34 bushels with minerals and ammonia salts (5a and 5b), of 25 bushels with minerals and the double dressing of ammonia salts (8a and 8aa), and of 15 bushels where the application had been made the year before (8b and 8bb). As the results show, the crops on plots 2a and 5a were simply miserable where no lime had been applied, but on the limed halves—as the photograph (fig. 3) indicated would be the case—they were quite good.

Lastly, farmyard manure (11b) gave, as in 1898 and former years, a better crop than rape dust (10b), it being one of the best of the series; and from the previous applications of these two manures, now stopped, there was a very considerable residue (11a and 10a).

As regards quality, the barleys were, as a whole, distinctly inferior. The hot weather had evidently spoiled the samples, and they were not properly ripened. The valuation was taken on a basis of 28*s.* per quarter for barley weighing 56 lb. per bushel. The best samples were those of plots 6 (minerals and nitrate of soda, light dressing) and 9b (minerals with nitrate of soda applied the year before). Mineral manures alone (4) and no manure (7) were fair, also 8bb (minerals with ammonia salts applied the year before). There was not a markedly low weight per bushel or higher

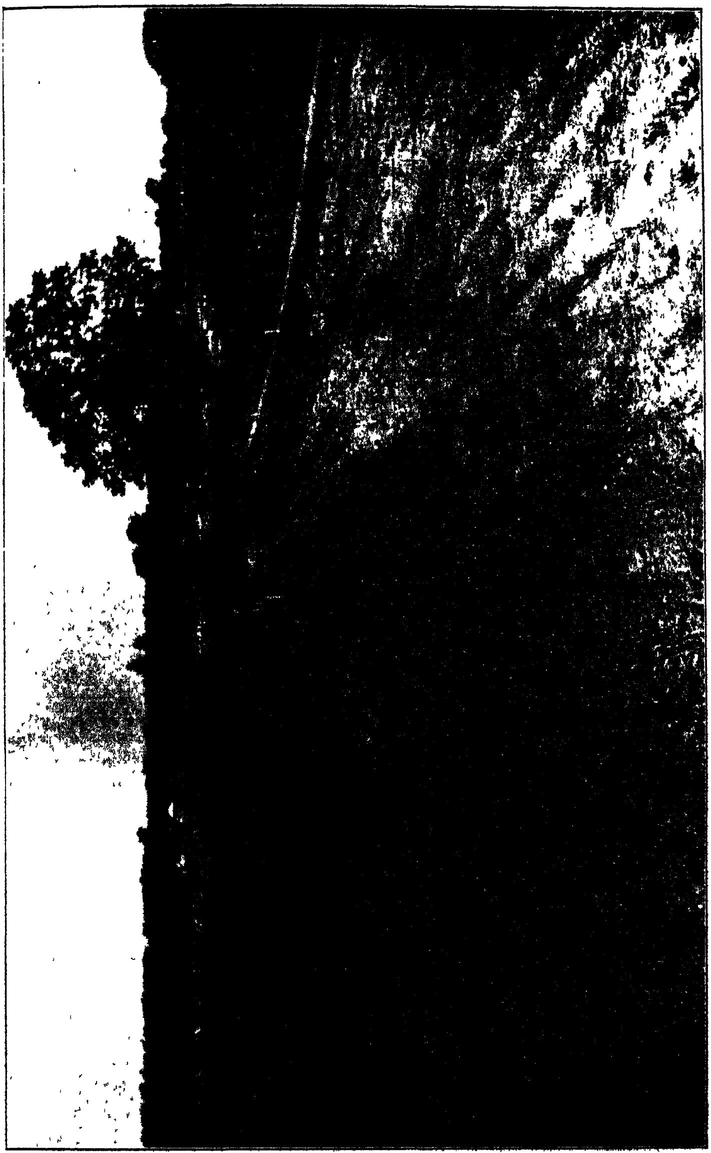

Fig. 3.—Appearance of plots 2a, 2b, 5a, and 5b (barley manured year after year with ammonia salts) on May 29, 1899. In the background are plots 2a (right), 2b (left), and in the foreground 5a (right) and 5b (left). The "b's" are the limed plots, the "a's" the unlimed ones.

TABLE III.—*Continuous Growing of Barley*, 1899 (23*rd Season*).

(Barley grown year after year, on the same land, the manures being applied every year.)

Stackyard Field—Produce per acre.

Plot	Manures per acre	Head corn			Tail corn	Straw, chaff, &c.			Value per quarter on basis of 28*s*.		Remarks
		Wght.	No. of bush.	Wgt. per bush.	Weight						
		lb.		lb.	lb.	c.	q.	lb.	*s.*	*d.*	
1	Unmanured	694	13·2	52·6	17	5	3	18	25	6	This sample does not contain much unripe corn, but is steely
2a	[1] Ammonia salts (containing 50 lb. ammonia)	290	5·5	53·2	8	3	1	20	25	0	
2b	Ammonia salts (containing 50 lb. ammonia) with 2 tons lime November 1897	1,611	30·3	53·2	42	14	0	7	25	0	Appears to have large proportion of unripe corn; classed with 5a and 2a
3	Nitrate of soda (containing nitrogen=50 lb. ammonia)	1,721	33·0	52·2	25	16	3	1	25	0	
4	[2] Mixed mineral manures (sulphates of potash, soda, and magnesia, with superphosphate)	1,008	18·8	53·7	21	9	0	19	27	6	Is kinder than 9a, and better than 8aa, little thinner skin
5a	Mixed mineral manures and ammonia salts (containing 50 lb. ammonia)	325	6·0	54·4	6	3	3	22	25	0	5a and 2a can be classed as the worst samples
5b	Mixed mineral manures and ammonia salts (containing 50 lb. ammonia), with 2 tons lime November 1897	2,220	40·0	55·4	44	17	1	0	27	0	This sample with 7 and 8bb are equal, and are of poor quality
6	Mixed mineral manures and nitrate of soda (containing nitrogen=50 lb. ammonia)	2,692	49·9	53·9	25	23	3	9	28	0	Best grown, and equal to 9b, but a coarse sample
7	Unmanured	903	16·9	53·4	14	7	3	17	27	0	Contains unripe kernels, some very steely. This also applies to 5b and 8bb
8a	Mineral manures and (in alternate years, 1899 included) ammonia salts (=100 lb. ammonia)	1,327	24·3	54·7	16	10	0	25	25	0	All poor samples, without any particular distinguishable feature
8aa	Mineral manures and (in alternate years, 1899 included) ammonia salts (=100 lb. ammonia), with 2 tons lime November 1897)	2,667	49·2	54·2	28	21	2	7	25	0	
8b	Mineral manures, ammonia salts (= 100 lb. ammonia) omitted (in alternate years, including 1899)	1,222	22·5	54·2	20	10	2	1	25	0	
8bb	Mineral manures, ammonia salts (= 100 lb. ammonia) omitted (in alternate years including 1899), with 2 tons lime November 1897	2,082	37·9	55·0	20	16	2	3	27	0	Steely
9a	Mineral manures and (in alternate years, 1899 included) nitrate of soda (containing nitrogen=100 lb. ammonia)	3,014	56·3	52·5	34	27	1	27	25	0	
9b	Mineral manures, nitrate of soda (containing nitrogen=100 lb. ammonia) omitted (in alternate years, including 1899)	1,538	28·4	54·2	12	12	3	1	28	0	Equal to 6. Slightly plumper than 8aa and kinder
10a	1889, rape cake (=50 lb. ammonia). No manure since	1,275	24·3	52·5	14	11	1	13	25	0	
10b	Rape cake (=100 lb. ammonia) every year since 1890	2,109	39·6	53·2	18	19	2	0	25	0	
11a	1877-81, farmyard manure (=200 lb. ammonia). No manure since	1,627	30·7	53·0	12	15	1	15	25	6	A little better than 1, but poor samples
11b	Farmyard manure (=200 lb. ammonia) every year	2,548	47·1	54·1	18	23	2	0	25	6	

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[1] Ammonia salts are equal weights of sulphate of ammonia and muriate of ammonia.

[2] Mixed mineral manures are, throughout, 3½ cwt. superphosphate of lime, 200 lb. sulphate of potash, 100 lb, sulphate of soda, and 100 lb. sulphate of magnesia per acre.

amount of tail corn with the use of nitrate of soda, but nitrate of soda used alone (plot 3) gave the worst quality of barley of all.

1900 (24TH SEASON).

The land, after a first ploughing on September 22, 1899, and a second one on March 10–12, 1900, was drilled on March 28 with 9 pecks per acre of "Archer's Stiff-straw" barley, the mineral manures having been put on plots 4, 5, 6, 8, and 9 the day previously. Farmyard manure was applied to 11b on March 28, and rape dust ta 10b on March 29. Up to April 25 the plots, with the exception of the ammonia salts ones to which no lime had been given (2a, 5a, 8a, and 8b), looked very well, but a severe frost on April 26 did much harm to the barley, which went nearly flat with the N.E. wind then prevailing. It took a long time to get up again, and, indeed, never fully recovered. The heavy top-dressings of nitrogenous salts were applied, as in the previous year, in two lots, the first half on May 8, the second on May 25, the lighter dressings on 2, 3, 5, and 6 being given on May 24 and 25. The barley came into ear by June 30. The appearance of the plots treated with ammonia salts was very striking. Where no lime had been applied there was almost no crop on 2a (ammonia salts alone), a very small one on 5a (minerals and ammonia salts), and on 8a and 8b (minerals and heavy dressing of ammonia salts) the crop was very patchy and uneven. By way of contrast, the corresponding plots on which the single application of lime in December 1897 (2 tons per acre) had been made were quite good crops, and at harvest time were found to yield respectively 28·9 bushels (2b), 33·7 bushels (5b), 23·5 bushels (8aa), and 45·3 bushels (8bb). The differences of appearance at the time of ripening are well brought out in fig. 4 (p. 285), which shows plots 2a (unlimed) and 2b (limed). The crop was cut August 28 and 29, carried on September 3, and subsequently threshed, weighed, and valued. The weights and particulars of valuation are given in Table IV. on page 284.

The produce was low all round, being considerably below the average of twenty years, and also less than the yield of 1899. The frost in April did much to harm the crops, and the unmanured ones (1 and 7) were not in agreement. Mineral manures (4) gave an increase of 2 bushels over no manure. The plots 2a, 5a, 8a, and 8b, where ammonia salts had been used without lime, were all very poor indeed, and the appearances shown in 1899 (fig. 3) were repeated. Ammonia salts when used where lime had been applied in December 1897 were rather better than the corresponding nitrate of soda plots. The single application of 2 tons of lime per acre in 1897 gave on the ammonia salts plots an increase of 23 bushels (2a and 2b), of 21 bushels (5a and 5b), of 11 bushels (8a and 8aa), and of 22 bushels (8b and 8bb). Rape dust gave rather a better return than farmyard manure, and both, especially the farmyard manure, showed some residue from previous applications.

The valuation of quality was taken on a basis of 30*s.* per quarter. The valuers reported that the samples were inferior to those

TABLE IV.—*Continuous Growing of Barley*, 1900 (*24th Season*).

(Barley grown year after year, on the same land, the manures being applied every year.)

Stackyard Field—Produce per acre.

Plot	Manures per acre	Head corn			Tail corn	Straw, chaff, &c.			Value per quarter on basis of 30*s.*		Remarks
		Wght.	No. of bush.	Wgt. per bush.	Weight						
		lb.		lb.	lb.	c.	q.	lb.	*s.*	*d.*	
1	Unmanured	448	8·4	53·1	6	5	2	25	25	0	Contains a deal of light corn ; is sound, but of poor quality
2a	[1] Ammonia salts (containing 50 lb. ammonia) . .	339	5·6	60·0	8	3	3	9	26	0	Even in growth
2b	Ammonia salts (containing 50 lb. ammonia) with 2 tons lime November 1897 .	1,532	28·9	53·0	28	14	0	21	25	0	Not so good in colour as 9b
3	Nitrate of soda (containing nitrogen = 50 lb. ammonia)	1,245	23·8	52·1	28	13	2	20	24	0	The worst sample of the series
4	[2] Mixed mineral manures (sulphates of potash, soda, and magnesia, with superphosphate) . . .	890	16·5	54·0	20	8	1	1	28	6	Even in growth, more evenly ripened than rest of plots, and is a moderate-sized berry
5a	Mixed mineral manures and ammonia salts (containing 50 lb. ammonia) . .	667	12·3	54·0	6	6	1	10	24	6	A little better than plot 3, but poor sample
5b	Mixed mineral manures and ammonia salts (containing 50 lb. ammonia), with 2 tons lime November 1897 .	1,842	33·7	54·6	16	17	0	4	27	0	Fairly even ; contains brown ended corns
6	Mixed mineral manures and nitrate of soda (containing nitrogen = 50 lb. ammonia)	1,745	32·7	53·3	36	19	0	10	26	0	Better colour than 2a and 8bb, but quality not so good
7	Unmanured	762	14·2	53·5	19	7	0	2	25	0	Larger corn than 10b, and more even
8a	Mineral manures, ammonia salts (=100 lb. ammonia) omitted (in alternate years, including 1900) . .	726	12·5	58·0	12	7	0	15	26	0	Contains a deal of thin corn
8aa	Mineral manures, ammonia salts (=100 lb. ammonia) omitted (in alternate years, including 1900), with 2 tons lime November 1897 .	1,299	23·5	55·2	16	10	0	16	27	6	Sound barley, not so large or even in growth as plot 4. nice skin
8b	Mineral manures and (in alternate years, 1900 included) ammonia salts (=100 lb. ammonia)	1,254	23·1	54·2	20	11	0	18	25	6	Thinner than 10a
8bb	Mineral manures and (in alternate years, 1900 included) ammonia salts (=100 lb. ammonia), with 2 tons lime November 1897 . .	2,476	45·3	54·6	32	25	2	1	26	6	Not so even in growth as 2a
9a	Mineral manures, nitrate of soda (containing nitrogen = 100 lb. ammonia) omitted (in alternate years, including 1900)	1,136	21·2	53·5	10	9	3	24	26	6	Large berry, but not so good in quality as 5b
9b	Mineral manures and (in alternate years, 1900 included) nitrate of soda (containing nitrogen = 100 lb. ammonia)	1,982	37·1	53·4	64	23	0	3	25	0	Little better colour than 2b
10a	1889, rape cake (=50 lb. ammonia). No manure since	723	13·4	54·0	12	7	0	15	25	6	Very little difference between this and 8b
10b	Rape cake (=100 lb. ammonia) every year since 1890 .	1,675	31·3	53·5	36	18	1	22	25	0	Slightly better colour than plot 7
11a	1877–81, farmyard manure (= 200 lb. ammonia). No manure since . . .	995	18·7	53·2	16	11	1	11	26	0	Poor corn, and not good in quality
11b	Farmyard manure (=200 lb. ammonia) every year .	1,581	29·5	53·6	18	17	2	1	26	0	Better colour than 2a and 8bb ; contains a lot of small corn

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[1] Ammonia salts are equal weights of sulphate of ammonia and muriate of ammonia.

[2] Mixed mineral manures are, throughout, 3½ cwt. superphosphate of lime, 200 lb. sulphate of potash, 100 lb. sulphate of soda, and 100 lb. sulphate of magnesia per acre.

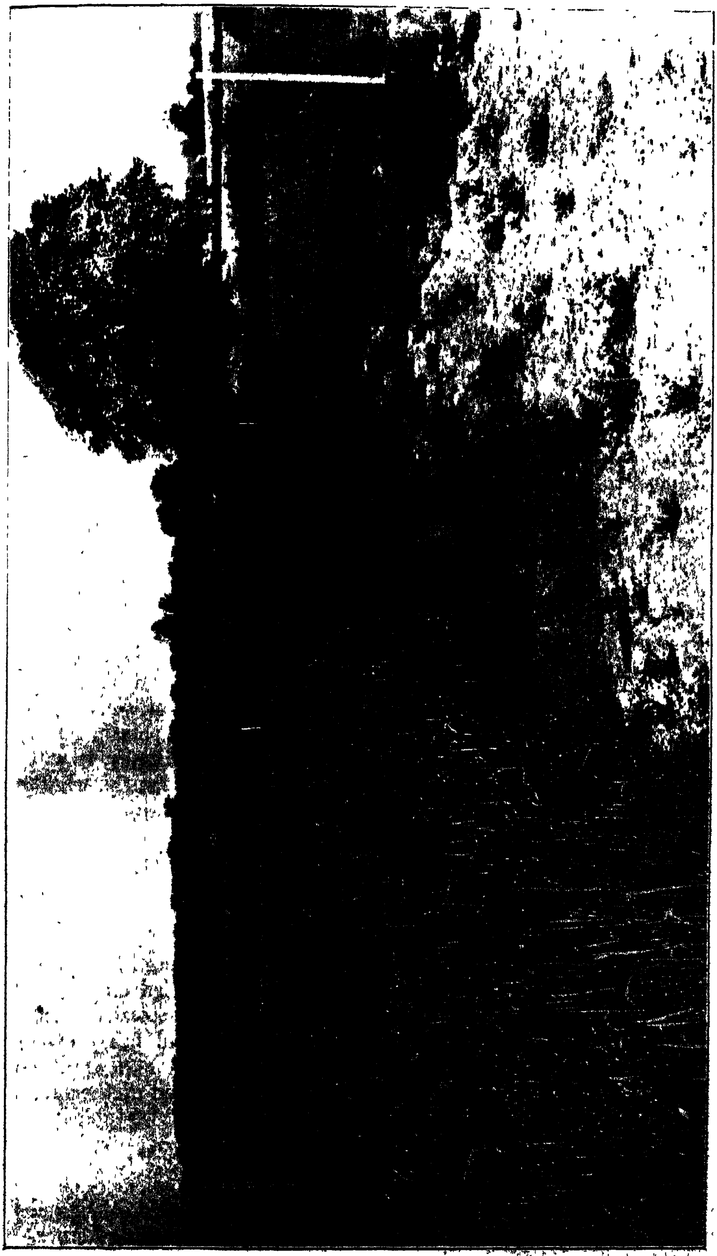

FIG. 4.—Appearance of plots 2a and 2b in July 1900. On the right is plot 2a (ammonia salts without lime), and on the left plot 2b (the same treatment, but with a single application of 2 tons per acre of lime in December 1897).

of last year, and of low standard. At the same time they wished it to be mentioned that the day was dull and the light very bad when they came to value. Not a single sample reached the standard, the best being that with mineral manures only (plot 4), this crop being put at 28*s*. 6*d*.; then came plot 8aa (minerals with ammonia salts applied the previous year). The unmanured plots, in contrast to the wheat, came out nearly the worst, and the absolute worst, alike in quality and weight per bushel, was plot 3, on which nitrate of soda alone had been used.

SUPPLEMENTARY EXPERIMENT WITH SOIL OF PLOT 2A (AMMONIA SALTS ONLY).

Several points had been noticed in connection with this plot. In the first place, while the barley would not grow, if there happened to be an oat plant on the plot it was observed to grow most luxuriantly. Then it was found, on testing the soil, that it had a distinctly acid reaction to litmus paper, and it became thus a question whether the sterility of the ground was due not merely to removal of lime or other constituents, but to some injurious acid in the soil itself. It was determined to work out this problem more fully at the Pot-Culture Station, and some of the soil from this plot (2a), on which ammonia salts had been continuously used for twenty-three years, was therefore filled into several earthenware pots. In these, barley, wheat, oats, and peas were respectively sown, in order to see whether, on the soil where barley would not (at least in the field) grow, the other crops named might flourish. Also, in order to counteract the acidity produced in the soil, a second pot, sown with each of the crops named, was treated with carbonate of potash. The results are shown in fig. 5 on the opposite page. Barley, it will be noticed, would not grow at all, but oats grew excellently, wheat very fairly, while peas grew also, but were very stunted. The addition of carbonate of potash did not enable the barley to thrive, nor did it seem to improve the condition of the other crops.

ROTATION EXPERIMENTS (*STACKYARD FIELD*).

In the two years 1899 and 1900 the process, begun in 1897, of levelling the fertility of the rotation plots was carried on by the growth, as soon as each rotation closed, of several successive crops of barley without manure, in order to get the land fairly even again before beginning a new series of experiments.

In 1899, barley crops could be grown on three out of the four rotations, and in 1900 on all four separate rotations.

1899.

On Rotation I. the wheat of 1898 closed the last rotation, and the barley crop now taken was the first of the "levelling" crops. On Rotation II. barley followed the barley of 1898, grown after roots fed on the land, so that the present was really the first "levelling" crop. On Rotation III. the former (5th complete) rotation was not yet over, and wheat (following seeds) formed the closing crop of it. On Rotation IV. the 5th rotation had already

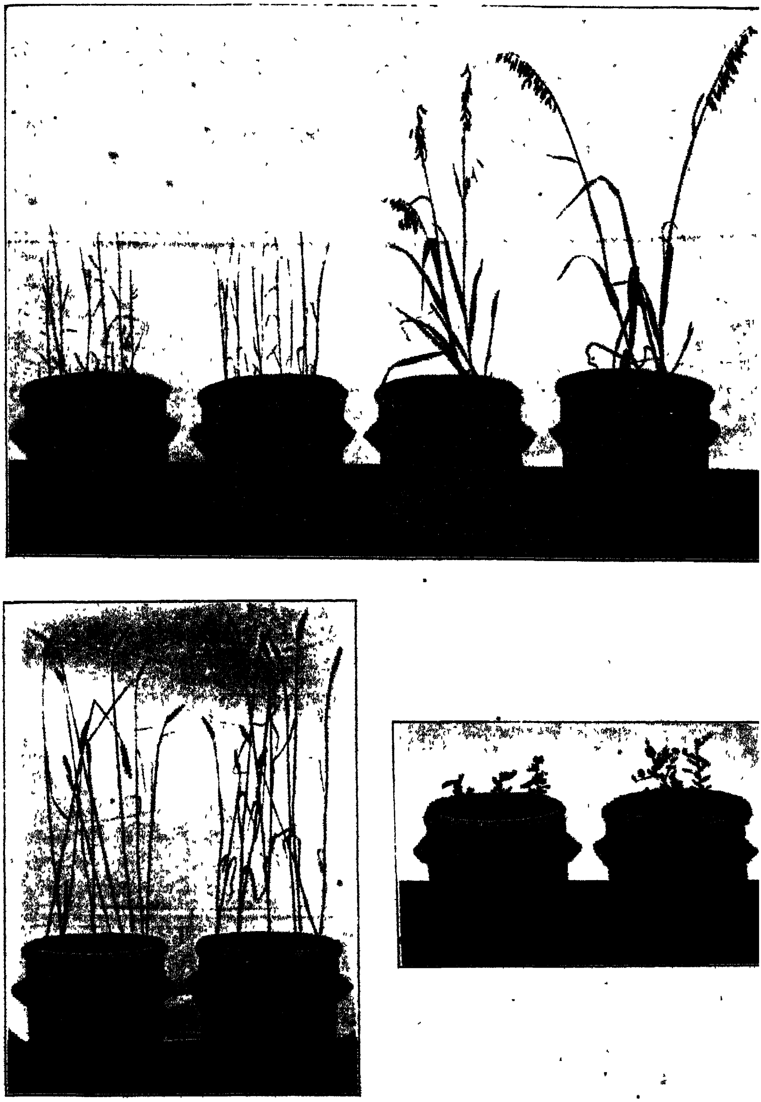

Fig. 5.—Barley, oats, wheat, and peas grown on soil of plot 2a (ammonia salts continuously). The right-hand pot in each case has had carbonate of potash added.

TABLE V.—*Rotation Experiments,* 1899.

Stackyard Field—Produce per acre.

Plot	Manures per acre	ROTATION I.—BARLEY								ROTATION II.—BARLEY							
		Head corn			Tail corn			Straw, chaff, &c.		Head corn			Tail corn			Straw, chaff, &c.	
		Weight	Bush.	Wght. per bush.	Weight	Bush.	Wght. per bush.			Weight	Bush.	Wght. per bush.	Weight	Bush.	Wght. per bush.		
		c. q. lb.		lb.	c. q. lb.		lb.	c. q. lb.		c. q. lb.		lb.	c. q. lb.		lb.	c. q. lb.	
1	Roots fed off [1] with sheep consuming 400 lb. decorticated cotton cake; 3 cwt. superphosphate to swedes	13 3 5	28·8	53·7	0 1 1	0·7	40	13 0 13		14 2 21	31·0	53·2	0 1 6½	0·9	38	15 3 24	
2	Roots fed off [1] with sheep consuming 400 lb. maize meal; 3 cwt. superphosphate to swedes	12 1 1	25·7	53·4	0 0 22	0·6	36	12 2 24		16 2 26	34·5	54·3	0 0 21½	0·7	34	16 1 7	
3	Roots fed off [1] with sheep without cake or meal; artificial equivalent of the cotton cake dung applied to succeeding barley; 3 cwt. superphosphate to swedes	11 0 19	23·7	52·8	0 0 26	0·9	30	11 0 17		15 1 8	31·7	54·1	0 1 6½	0·9	40	14 3 9	
4	Roots fed off [1] with sheep without cake or meal; artificial equivalent of the maize meal dung applied to succeeding barley; 3 cwt. superphosphate to swedes	11 1 22	24·1	53·3	0 0 18	0·6	30	10 2 7		13 3 4	28·3	54·5	0 0 25½	0·7	38	12 3 7	
5	No manure [2] (cotton cake plot)	12 0 13	25·3	53·7	0 0 26	0·7	38	11 2 24		11 2 13	24·4	53·4	0 1 17½	1·1	40	12 2 19	
6	No manure [2] (maize meal plot)	11 3 8	24·7	53·5	0 0 25	0·7	36	12 1 11		14 2 21	30·4	54·1	0 2 5½	1·5	40	16 1 13	
7	No manure [2] (artificial equivalent of cotton cake dung plot)	9 2 16	20·4	53·0	0 0 19	0·6	34	9 1 19		12 2 3	26·1	53·7	0 1 5½	0·9	38	12 3 20	
8	No manure [2] (artificial equivalent of maize meal dung plot)	11 2 10	24·5	53·0	0 0 15	0·5	32	10 3 24		12 2 24	26·5	53·7	0 1 12	1·0	40	12 3 15	

TABLE VI.—*Rotation Experiments*, 1899.

Stackyard Field—Produce per acre.

Plot	Manures per acre	ROTATION III.—WHEAT														ROTATION IV.—BARLEY.													
		Head corn					Tail corn					Straw, chaff, &c.				Head corn					Tail corn					Straw, chaff, &c.			
		Weight			Bush.	Wght. per bush.	Weight			Bush.	Wght. per bush.					Weight			Bush.	Wght. per bush.	Weight			Bush.	Wght. per bush.				
		c.	q.	lb.		lb.	c.	q.	lb.		lb.	c.	q.	lb.		c.	q.	lb.		lb.	c.	q.	lb.		lb.	c.	q.	lb.	
1	Roots fed off[1] with sheep consuming 400 lb. decorticated cotton cake; 3 cwt. superphosphate to swedes . .	24	0	0	43·0	62·5	0	0	27½	0·7	42	33	3	4		11	3	20	24·9	53·6	0	0	26½	0·7	36	12	0	22	
2	Roots fed off[1] with sheep consuming 400 lb. maize meal; 3 cwt. superphosphate to swedes	19	3	15½	35·5	62·7	0	0	24½	0·7	36	27	3	15		11	3	16	25·3	52·7	0	1	10½	1·1	36	12	1	5	
3	Roots fed off[1] with sheep without cake or meal; artificial equivalent of the cotton cake dung applied to succeeding barley; 3 cwt. superphosphate to swedes . .	21	3	18½	39·2	62·5	0	0	25½	0·6	40	30	0	10		11	2	18	24·8	52·6	0	1	12½	1·1	38	12	2	23	
4	Roots fed off[1] with sheep without cake or meal; artificial equivalent of the maize meal dung applied to succeeding barley; 3 cwt. superphosphate to swedes . .	22	0	15	39·5	62·8	0	0	21	0·6	36	31	0	8½		10	0	14	21·1	52·9	0	1	10	1·1	36	10	3	7	
5	No manure[2] (cotton cake plot) . .	22	1	2	39·5	63·2	0	0	18	0·4	42	26	1	17		10	1	16	21·8	53·1	0	0	14	0·4	36	11	0	2	
6	No manure[2] (maize meal plot). .	17	3	24½	31·8	63·2	0	0	20	0·5	40	22	3	16½		13	1	16	27·4	51·7	0	1	5½	0·8	40	13	1	12	
7	No manure[2] (artificial equivalent of cotton cake dung plot)	20	1	22	36·4	62·8	0	0	23	0·6	38	26	3	21		12	2	9	26·1	53·9	0	0	24½	0·6	38	12	1	19	
8	No manure[2] (artificial equivalent of maize meal dung plot)	20	2	14	37·8	61·1	0	0	19½	0·5	36	28	1	16½		12	1	7	25·5	54·1	0	0	15	0·5	32	12	0	9	

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[1] In 1896 (Rotation III.), in 1894 (Rotation IV.).

[2] Since 1885.

been concluded, and one barley crop (1898) had been taken in the course of levelling, so that the present was the second exhausting crop.

On Rotations I., II. and IV., the barley grown was "Archer's Stiff-straw," and on Rotation III. the wheat was "White-chaffed Browick." The crop results are given in Tables V. and VI. on pages 288 and 289.

1900.

This year barley was the crop over all the four rotations. On Rotation I. it was the second "levelling" crop, on Rotation II. also the second, on Rotation III. the first (the 5th complete rotation being concluded with the wheat of 1899), and on Rotation IV. the third "levelling" crop.

"Hallett's Pedigree" was the variety of barley grown. The crop results are given in Tables VII. and VIII. on pages 291 and 292.

In regard to the produce, Table IX., in which the yields of the different rotations for the two years, 1899 and 1900, are compared, as also the averages of the manured plots (1–4) and the unmanured (5–8), will show how the process of levelling down is going on (page 293).

The difference between the manured plots and the unmanured plots in 1900 is inconsiderable, except in Rotation IV., and the figures generally show a marked lowering of yielding power. How far this may be due, however, to seasonal influences and to variety of barley grown it is not possible at this stage to say. Rotations I. and II. would seem to be now reduced to about the same level, both having had, it will be remembered, two "levelling" crops of barley taken off; while Rotation IV., which has had three such crops taken off, gave, as might be expected, a lower yield. Similarly, the higher produce of Rotation III. is clearly explainable, seeing that the present was the first "levelling" crop of barley taken off. It will be necessary to reduce it further by the continued growing of barley crops, before the rotation land generally is in sufficiently even condition as regards fertility to enable the experiment to be recommenced on new lines.

ROTATION EXPERIMENTS (*LANSOME FIELD*) 1899 and 1900.

These experiments are in continuance of those in Stackyard Field. The manurial applications are made once in the four-course rotation only, viz. for the barley crop, either by the feeding off of the previous root crop with cake or corn, or with the cake and corn spread direct as meal on the land.

Wheat ("White-chaffed Browick") was the crop in 1899, and Swedes (Hunter's "Chester Monarch") in 1900.

The results are given in Tables X. and XI. on page 293.

GREEN-MANURING EXPERIMENT (*LANSOME FIELD*). 1899.

Wheat after Green Crops Ploughed in.

This experiment, now in progress since 1892, is for the purpose of ascertaining whether the ploughing-in of a leguminous crop like

TABLE VII.—*Rotation Experiments*, 1900. *Rotations I. and II.—Barley.*

Stackyard Field—Produce per acre.

Plot	Manures in 1900.	Rotation I.							Rotation II.						
		Head corn			Tail corn			Straw, chaff, &c.	Head corn			Tail corn			Straw, chaff, &c.
		Weight	Bush.	Wght. per bush.	Weight	Bush.	Wght. per bush.		Weight	Bush.	Wght. per bush.	Weight	Bush.	Wght. per bush.	
		c. q. lb.		lb.	c. q. lb.		lb.	c. q. lb.	c. q. lb.		lb.	c. q. lb.		lb.	c. q. lb.
1	No manure[1] (cotton cake plot)	6 3 2½	14·3	52·8	0 0 14½	·38	38	7 3 12½	7 3 1	16·5	52·8	0 0 10½	·33	32	8 1 3
2	No manure[1] (maize meal plot)	6 0 9	13·0	52·4	0 0 9½	·28	34	6 2 5	7 0 16½	11·9	53·7	0 0 8½	·30	28	7 0 14½
3	No manure[1] (artificial equivalent of cotton cake plot)	4 3 13	10·6	51·2	0 0 8½	·28	30	6 0 22	5 3 26½	12·3	54·4	0 0 7½	·27	28	6 1 12
4	No manure[1] (artificial equivalent of maize meal plot)	7 1 22	16·2	51·5	0 0 8	·25	32	8 2 8	6 0 2½	12·8	52·6	0 0 8½	·35	24	6 1 21½
5	No manure[2] (cotton cake plot)	6 0 14	13·5	50·8	0 0 8½	·28	30	7 1 17½	6 1 4½	13·4	52·6	0 0 7	·29	24	8 1 10
6	No manure[2] (maize meal plot)	6 1 13½	14·0	50·9	0 0 9	·30	30	6 3 10½	7 0 6½	14·9	52·9	0 0 6	—	—	8 0 12½
7	No manure[2] (artificial equivalent of cotton cake dung plot)	5 0 10	11·1	51·2	0 0 6½	—	—	5 3 16	6 2 14½	14·0	53·0	0 0 7½	·25	30	7 0 16
8	No manure[2] (artificial equivalent of maize meal dung plot)	7 1 17	16·0	51·8	0 0 7	—	—	7 10	5 2 11	11·9	52·6	0 0 6	—	—	6 0 10

Manured until 1899—once in the rotation—by feeding off roots with decorticated cotton cake and maize meal respectively.

[2] Unmanured since 1885.

TABLE VIII.—*Rotation Experiments*, 1900. *Rotations III. and IV.—Barley.*

Stackyard Field—Produce per acre.

Plot	Manures in 1900	ROTATION III.													ROTATION IV.													
		Head corn					Tail corn					Straw, chaff, &c.			Head corn					Tail corn					Straw, chaff, &c.		
		Weight			Bush.	Wght. per bush.	Weight			Bush.	Wght. per bush.				Weight			Bush.	Wght. per bush.	Weight			Bush.	Wght. per bush.			
		c.	q.	lb.		lb.	c.	q.	lb.		lb.	c.	q.	lb.	c.	q.	lb.		b.	c.	q.	lb.		lb.	c.	q.	lb.
1	No manure[1] (cotton cake plot) . .	7	1	0	15·9	51·0	0	0	9	·28	32	6	3	19½	4	3	18½	10·3	53·2	0	0	10	·28	36	6	0	23½
2	No manure[1] (maize meal plot) . .	9	1	5½	20·1	51·9	0	0	11	·40	28	9	3	7½	5	0	26	11·6	50·5	0	0	16	·61	26	6	3	9½
3	No manure[1] (artificial equivalent of cotton cake plot)	10	3	10½	23·1	52·6	0	0	16½	·37	44	10	3	21		3	18	12·6	52·4	0	0	12½	·35	36	7	2	18½
4	No manure[1] (artificial equivalent of maize meal plot)	9	3	13½	20·9	52·8	0	0	11	·34	32	10	1	23	5	0	10	10·8	52·5	0	0	12	·30	36	6	2	12
5	No manure[2] (cotton cake plot) . .	9	3	6	20·4	53·8	0	0	11	·32	34	9	1	4	3	2	15	7·6	53·4	0	0	5	·15	32	5	1	3
6	No manure[2] (maize meal plot) . .	10	2	18	22·4	53·4	0	0	10½	·31	34	10	0	25	2	2	11½	5·3	51·5	0	0	4	·12	32	4	0	0
7	No manure[2] (artificial equivalent of cotton cake dung plot) . . .	9	2	20	20·2	53·7	0	0	9½	·25	38	9	2	6	3	0	7½	6·4	53·4	0	0	4	·12	32	4	2	17
8	No manure[2] (artificial equivalent of maize meal dung plot) . . .	9	3	3½	20·4	53·5	0	0	10½	·31	34	10	1	25	4	2	0	9·3	54·2	0	0	7½	—	—	5	2	5

[1] Manured until 1900 (Rotation III.), 1898 (Rotation IV.)—once in the rotation—by feeding off roots with decorticated cotton cake and maize meal respectively.

[2] Unmanured since 1885.

tares, in the green state, will produce a better crop of corn subsequently than will the ploughing in of a non-leguminous crop like the cruciferous ones, mustard and rape.

TABLE IX.—*Rotation Barley,* 1899 *and* 1900.

Average Produce of Manured and Unmanured Plots.

—	Average produce of manured plots (1–4)		Average produce of unmanured plots (5–8)	
	1899 Bushels	1900 Bushels	1899 Bushels	1900 Bushels
Rotation I. . .	25·6	13·5	23·7	13·6
„ II. . .	31·4	14·1	26·9	13·6
„ III. . .	(wheat, 39·3)	20·0	(wheat, 36·4)	21·8
„ IV. . .	24·1	11·3	25·2	7·2

TABLE X.—*Rotation Experiments on the Comparative Manurial Values of Decorticated Cotton Cake and Maize Meal (Lansome Field).*

Plot	1899. Wheat—Produce per acre					
	After clover-hay—Manures used for barley only	Head corn			Tailcorn	Straw, chaff, &c.
		Weight	Bush.	Weight per bush.	Weight	
		c. q. lb.		lb.	q. lb.	c. q. lb.
1	Unmanured plot	18 2 17	32·6	64·0	0 23	28 2 27
2	Decorticated cotton cake dung plot	20 3 13	36·5	64·0	0 25	32 0 24
3	Decorticated cotton cake meal (as top-dressing) plot . .	17 1 3	30 3	63·9	1 1	27 0 19
4	Unmanured plot . . .	19 1 17	33·9	64·1	1 2	28 0 26
5	Maize meal dung plot . .	20 2 21	36·1	64·1	1 7	31 0 6
6	Maize meal (as top-dressing) plot	18 3 18	33·0	64·1	0 26	29 2 11

TABLE XI.—*Rotation Experiments on the Comparative Manurial Values of Decorticated Cotton Cake and Maize Meal (Lansome Field).*

1900: Swedes—Produce per acre.

Plot	After wheat—Manure used for barley only	Roots	Leaves
		t. c. q.	c. q. lb.
1	Unmanured plot	12 18 1	17 1 16
2	Decorticated cotton cake dung plot .	12 7 1	18 0 12
3	Decorticated cotton cake meal (as top-dressing) plot	13 7 2	19 3 4
4	Unmanured plot	11 3 0	17 3 4
5	Maize meal dung plot.	9 8 1	12 2 8
6	Maize meal (as top-dressing) plot .	10 3 1	15 2 0

After ploughing in the respective green crops grown in 1898, White-chaffed Browick" wheat was sown. The produce is given in Table XII.

TABLE XII.—*Green-manuring Experiment* (*Lansome Field*).

Produce of wheat per acre, 1899.

Plot	Manuring	Head corn			Tail corn	Straw, chaff, &c.		
		Weight	Bush.	Weight per bushel	Weight			
		lb.		lb.	lb.	c.	q.	lb.
1	Tares ploughed in, with mineral manures .	1,702	26·8	63·4	34	27	3	12
2	Tares ploughed in, without mineral manures	1,191	18·8	63·5	22	19	3	11
3	Rape ploughed in, with mineral manures .	1,471	23·3	63·2	24	24	0	9
4	Rape ploughed in, without mineral manures	1,525	24·1	63·4	31	22	0	8
5	Mustard ploughed in, with mineral manures .	1,846	29·1	63·5	36	29	0	8
6	Mustard ploughed in, without mineral manures	1,881	29·6	63·5	31	27	1	14

The highest produce, it will be seen, was that after mustard ploughed in. Green crops—two crops of each kind—were again grown in 1900, and successively ploughed in.

VARIETIES OF BARLEY; AND KILN-DRYING OF BARLEY, 1899 *and* 1900 (*GREAT HILL*).

Experiments were continued in 1899 and 1900 on the growing of different varieties of barley, and on the use of barley that was kiln-dried before sowing, as against the ordinary seed. The results for the two years are given in Table XIII. on the opposite page.

From this experiment, generally, it would seem that there is—at least in such seasons as those of 1899 and 1900—no particular advantage in kiln-drying barley seed before sowing it. Also, that, as between the varieties tried, the best yielding and best quality barley was the "Danish," and the next the local variety, "Golden Melon," and after that "Goldthorpe."

LUCERNE (*STACKYARD FIELD*), 1899 *and* 1900.

These plots were first laid down in 1889, and the manures are put on every year.

The results for the two years 1899 and 1900 are given in Table XIV. on page 296.

TABLE XIII.—*Varieties of Barley; and Kiln-drying of Seed Barley* (*Great Hill*), 1899 *and* 1900.

Plot	Variety	1899.—Produce per acre									1900.—Produce per acre									Plot
		Head corn			Tail corn	Straw, chaff, &c.			Value per quarter on basis of 28*s*.		Head corn			Tail corn	Straw, chaff, &c.			Value per quarter on basis of 30*s*.		
		Weight	Bush.	Weight per bushel	Weight						Weight	Bush.	Weight per bushel	Weight						
		lb.		lb.	lb.	c.	q.	lb.	*s.*	*d.*	lb.		lb.	lb.	c.	q.	lb.	*s.*	*d.*	
1	"Archer's Stiff-straw" . . not dried	1,903	35·0	54·3	29	19	1	13	26	6	—	—	—	—		—		—		1
2	" " . . . kiln-dried	2,009	36·5	55·0	28	25	0	0	26	6	—	—	—	—		—		—		2
3	"Standwell" . . . . . not dried	1,935	35·6	54·3	33	22	2	21	28	0	—	—	—	—		—		—		3
4	" . . . . . . kiln-dried	1,915	36·2	52·9	34	22	3	24	26	6	—	—	—	—		—		—		4
5	"Hallett's Pedigree" . . . not dried	1,910	34·6	55·2	28	23	0	8	29	6	1,444	26·9	53·5	18	15	2	4	29	6	5
6	" " . . . kiln-dried	2,011	37·2	54·0	29	23	3	0	28	6	1,482	27·7	53·4	13	15	3	21	28	6	6
7	"Danish" . . . . . not dried	2,496	45·5	54·8	26	22	3	23	30	0	1,612	29·9	53·8	19	17	3	24	28	6	7
8	" . . . . . . kiln-dried	2,463	46·0	53·5	44	27	3	19	29	0	1,542	28·8	53·5	16	17	0	20	28	0	8
9	"Goldthorpe" . . . . not dried	2,108	39·2	53·7	48	22	1	21	27	6	1,316	24·6	53·4	5	14	0	15	30	0	9
10	" . . . . . kiln-dried	2,180	40·6	53·6	78	22	1	19	27	0	1,443	27·2	53·0	10	15	2	19	29	6	10
11	"Moldavian" . . . . not dried	1,961	36·1	54·2	46	19	2	22	26	0	—	—	—	—		—		—		11
12	" . . . . . kiln-dried	1,925	35·9	53·6	55	19	2	7	26	0	—	—	—	—		—		—		12
13	"Golden Melon" . . . . not dried, and manured with salt	2,246	41·4	54·2	56	25	3	7	26	0	—	—	—	—		—		—		13
14	" " . . . . . kiln-dried	2,122	39·1	54·2	52	22	1	3	26	0	1,535	28·5	53·8	22	17	1	11	28	0	14
15	" " - not dried, and without salt	2,060	37·8	54·5	53	24	1	18	29	0	1,511	28·0	53·9	18	17	0	3	28	6	15

TABLE XIV.—*Lucerne* (*Stackyard Field*).

Green produce per acre, 1899 and 1900.

Plot	Manures per acre, applied annually	1899 Green produce[1]				1900 Green produce[1]			
		t.	c.	qr.	lb.	t.	c.	qr.	lb.
1	No manure	3	11	1	23	4	9	2	17
2	Superphosphate, 4 cwt.; bone dust, 4 cwt..	4	4	3	21	4	19	0	10
3	Sulphate of potash, 4 cwt .	10	11	2	19	10	7	2	14
4	Sulphate of ammonia, 2 cwt. .	7	6	3	23	7	1	2	7
5	Nitrate of soda, 2 cwt. . .	9	6	0	6	10	2	3	17
6	Superphosphate, 4 cwt.; bone dust, 4 cwt.; sulphate of potash, 4 cwt.; sulphate of ammonia, 2 cwt. . . .	15	19	2	3	17	1	3	2
7	Superphosphate, 4 cwt.; bone dust, 4 cwt.; sulphate of potash, 4 cwt.; nitrate of soda, 2 cwt.. . . .	15	8	2	27	17	1	0	11

[1] Three cuttings.

It will be seen that in both years plots 6 and 7 (mixed manures with sulphate of potash) have maintained their superiority.

SAINFOIN (*STACKYARD FIELD*), 1900.

Lucerne having been successfully grown on the "clover-sick" soil of Stackyard Field, it was decided to try Sainfoin on plots closely adjoining the lucerne land. It was further suggested that different varieties of sainfoin should be tried, and that the question whether English seed or foreign was the better should be tested. This was accordingly done, and four different varieties were sown in May 1900. They gave one cutting each that year, as follows :—

Plot	Variety	Green produce per acre			
		t.	c.	qr.	lb.
1	English giant	1	16	3	9
2	„ common	1	10	1	22
3	French giant	1	14	1	14
4	„ common	1	10	1	22

LATHYRUS SYLVESTRIS (*STACKYARD FIELD*), 1899 *and* 1900.

The plot, first sown in 1890, continues to yield a crop. The weights in 1899 and 1900 were :—

	1899				1900			
	t.	c.	qr.	lb.	t.	c.	qr.	lb.
Green produce per acre . .	4	18	2	18	7	17	3	7

EXPERIMENTS ON PASTURE.

1. *On Laying Land Down to Grass* (*Great Hill Bottom*), 1899 *and* 1900.

This field was laid down in 1896 with different seed mixtures, at various costs, some containing rye grass and some not. Further, one-half of each plot was mown each year and the other half fed with sheep. Up to and including 1893 this system was maintained; in 1894 and 1895 all plots were hayed. From 1896 to 1898 inclusive, the whole field was grazed by cattle. In 1899 it was hayed, and the produce is set out in Table XV.

TABLE XV.—*Pasture Experiments* (*Great Hill Bottom*).

Produce of Hay, 1899.

Plot	Cost of seeding per acre	Original seeding and treatment	Produce of hay per acre, 1899			
			t.	c.	q.	lb.
1a	21*s.*	Without rye grass, mown half	1	10	2	0
		„ „ fed „	1	5	0	0
1b	17*s.* 6*d.*	With „ mown „	1	8	0	0
		„ „ fed „	1	8	3	0
2a	30*s.*	Without „ mown „	1	5	1	0
		„ „ fed „	1	3	0	0
2b	24*s.*	With „ mown „	1	9	2	0[1]
		„ „ fed „	1	7	3	0[1]
3a	26*s.*	Thick seeding, mown „	1	8	2	19
		„ „ fed „	1	8	1	9
3b	13*s.*	Thin „ mown „	1	7	2	0
		„ „ fed „	1	8	2	11

[1] Results, owing to bad weather, somewhat doubtful.

In 1900 the field was again grazed with stock.

2. *The Improvement of Old Pasture.*

a. Broad Mead.—These experiments were begun in 1893, and manures were applied again in the spring of 1899. Both in 1899 and 1900 the first crop was taken as hay, the aftermath being grazed with cattle. The weights of hay are given in Table XVI.

TABLE XVI.—*Grass Experiments* (*Broad Mead*).

Produce of Hay, 1899 and 1900.

Plot	Manures per acre in 1899	Weight of hay per acre, 1899				Weight of hay per acre, 1900			
		t.	c.	q.	lb.	t.	c.	q.	lb.
1	Gypsum, 5 cwt.	1	9	2	0	1	8	2	0
2	Basic slag, 8 cwt.	1	3	2	0	1	8	3	4
3	Mineral superphosphate, 3 cwt.	1	8	2	0	1	5	1	4
4	No manure	1	7	0	0	1	5	1	20
5	Lime, 2 tons	1	15	2	0	1	13	3	4

Lime, which had begun to show an improvement in appearance of herbage before 1896, though no increase in crop, gave the highest produce of hay in 1897, and in both 1899 and 1900 this increase was maintained. The other manures, including basic slag, showed little.

The lime plot all along had the brightest and freshest look, and the herbage was decidedly finer than on any of the other plots.

b. Long Mead.—A further set of experiments, on the lines of the foregoing, was commenced in 1900.

GORSE (*GREAT HILL*).

This crop, first sown in May 1897, continues to grow well, and was used throughout the winters 1898–1900 for sheep-feeding.

PREVENTION OF POTATO DISEASE. 1899 (*ROAD PIECE*), and 1900 (*GREAT HILL*).

The experiments on this subject were continued, and the results of 1900 are given in Table XVII.

TABLE XVII.—*Experiments on the Prevention of "Potato Disease" (Great Hill).*

Produce per acre, 1900.

Plot	Variety	Treatment	Sound potatoes per acre				Diseased potatoes per acre		
			t.	c.	q.	lb.	c.	q.	lb.
1a	"Coles's Favourite"	Sprayed . .	5	9	3	0	1	0	8
1b	" "	Not sprayed .	5	14	3	0	2	2	4
2a	"British Queen" .	Sprayed . .	10	18	1	0		none	
2b	" "	Not sprayed .	10	10	0	0	6	0	24
3a	"Challenge" . .	Sprayed . .	6	9	0	0	0	2	10
3b	"	Not sprayed .	6	8	0	0	7	2	24
4a	"Up to Date" .	Sprayed . .	11	5	3	14	0	2	16
4b	"	Not sprayed .	10	1	3	14	1	2	12

The year was not one of pronounced disease, but it is evident from the figures given that spraying with "Bouillie Bordelaise" had the effect of materially reducing the disease.

"FINGER-AND-TOE" IN TURNIPS (*GREAT HILL*), 1899 *and* 1900.

Experiments on this subject have been in progress since 1896, a large number of suggested remedies having been tried. None of them, however, have been entirely successful in preventing the disease, though lime, in some form, has come out far ahead of all other materials employed. The results of 1900 are given in Table XVIII.

TABLE XVIII.—" *Finger-and-Toe* " *Experiments on Swedes (Great Hill).*

Produce of Usable and Unsound Roots, 1900.

Plot	Applications per acre	Weight of usable roots per plot	Weight of unsound roots per plot	Total weight of roots per acre			
		lb.	lb.	t.	c.	qr.	lb.
1	Lime, 2 tons . . .	350½	225¼	3	1	2	21
2	Nothing	110	142¼	1	7	0	3
3	Gas-lime, 2 tons . .	350¾	228¼	3	2	0	4
4	Basic slag, 10 cwt. . .	217¾	204¾	2	5	1	2
5	Nothing	117½	146½	1	8	1	4

These results entirely bear out those of the preceding years. The crop on this poor land was extremely small, but it is still brought out that lime and gas-lime produced much the largest weight of usable roots, while basic slag improved the crop, though to a lesser extent. The untreated plots were very regular as regards produce.

RAINFALL AT THE WOBURN EXPERIMENTAL FARM IN 1899 AND 1900.

	1899	1900		1899	1900
	in.	in.		in.	in.
January . . .	2·20	3·39	July	1·57	2·13
February . .	1·91	4·20	August . .	·95	3·96
March	·68	·88	September . .	1·73	·38
April	2·18	·93	October . .	2·33	2·28
May	2·45	1·61	November . .	2·32	2·07
June	·92	2·25	December . .	1·18	2·83
			Total .	20·42	26·91

II.—VALUE OF CONDIMENTS IN THE FEEDING OF BULLOCKS.

(*An experiment conducted during the winter of* 1900–1901.)

THE question has often been asked whether there is any real value attaching to the use of spices and other condimental foods which are advocated as an addition to the ordinary feeding materials given to stock. As is well known, different cattle-spices are largely advertised, and various spices are used in the compounding of mixed feeding-cakes, as also are such condimental and sweetening foods as locust bean, molasses, &c. These appeal for favour mainly on account of their being " tasty " or " sweet," and on the belief that they are " appetising " and induce stock to take their food more freely. It is also not unusual to throw a little spice over inferior or damaged food to make it more palatable, or to use the spice as a means of getting cattle to eat more bulky food of lower value, such as straw-chaff. The same has been sought to be effected by pouring molasses over straw-chaff, and making up in measure for absence or scarcity of roots. How far these desired results have been obtained has been a matter of pure conjecture; and it has long been open to doubt whether the frequently extravagant prices at which spices and condimental mixtures have been sold has been in any way warranted in actual feeding practice.

Accordingly, the Chemical and Woburn Committee deemed it desirable to set on foot an experiment at the Woburn Farm, with a view of throwing light on this question and of ascertaining, if possible, whether there was any material difference between fattening bullocks on a good ordinary diet of cake and corn, with hay, straw-chaff, and roots, and giving them these partly replaced by a sweetening food such as locust bean, or by the addition of some spice, or by the use of molasses (feeding treacle).

Locust bean is a material of pleasantly sweet nature, containing a considerable amount of sugar (about 50 per cent.).

There being objections, owing to the large amount of saline bodies present and the disagreeable flavour, to the use of molasses obtained from beet-sugar manufacture, it was determined to use only cane-sugar molasses.

As regards spice, there were obvious objections to the employment of any one of the many spices on the market prepared by particular firms, so I had prepared for me a mixture comprising the following ingredients: Liquorice, aniseed, gentian, fenugreek, coriander, caraway, cumin, and ginger.

Sixteen Shorthorn bullocks, rising three years old, and which cost, in May 1900, 12*l*. 2*s*. 6*d*. each, were used for the experiment, and were weighed on November 22, 1900, after receiving a limited ration of food the first thing in the morning. They were then divided, according to their respective weights, into four lots of four bullocks each.

The ordinary or "standard" feeding decided on was:—Linseed cake 2 lb. and decorticated cotton cake 2 lb.; maize meal 2 lb. per head daily, with hay, oat-straw chaff, and roots, *ad lib.*

Four bullocks to receive the above were placed in the feeding-boxes, left side. To four other bullocks, put in the feeding boxes, right side, the same amount of cake was given, but the maize meal of Lot I. was half replaced by locust-bean meal, the latter being, like maize, a food of carbohydrate nature. This was practically the part substitution of starch by sugar. Other four bullocks were put in the left-hand division of the yard and received the same foods and quantities as Lot I. but had in addition a little of the mixed spice sprinkled over their food from time to time. The fourth lot of four bullocks were placed in the right-hand division of the yard, and had foods as Lot I. but, in addition, a little molasses poured over their chaff.

The spice (which was finely ground) was weighed out, mixed with a little maize meal, and kept in a bag in the yard, a handful being thrown now and again over the chaff in the cribs. Care was taken to add enough spice to just impart a flavour without being overpowering. The molasses was added to an equal quantity of warm water and poured over the chaff overnight, the whole being then well mixed. The yards in which the bullocks were, were each provided with a shelter at one end.

The weights of the bullocks at the commencement of the experiment are given in Table IV. on pages 305 and 306.

The arrangement of the four lots and their respective feeding just after the commencement of the experiment was :—

—	Lot I. (Left boxes) 4 bullocks, per head daily	Lot II. (Right boxes) 4 bullocks, per head daily	Lot III. (Left yard) 4 bullocks, per head daily	Lot IV. (Right yard) 4 bullocks, per head daily
	lb.	lb.	lb.	lb.
Linseed cake	3	3	3	3
Decorticated cotton cake	1½	1½	1½	1½
Maize meal	1½	1	1½	1½
Locust-bean meal	—	½	—	—
Hay (long)	3	3	3	3
Oat-straw chaff	11	11	12	13
Swedes	35	35	35	35
Spice	—	—	¼	—
Molasses	—	—	—	¼
Water	40	43	42	42

The first alteration was made in respect of the spice. At starting, ½ lb. of spice was thrown over the chaff, but this seemed too strong and the bullocks fell off in the amount of chaff taken, so the spice was reduced to ¼ lb. per head daily, and the animals then ate the chaff better. On December 2 the plan was tried of mixing spice with the cake—2½ lb. of spice to 1½ cwt. of cake—but this did not prove satisfactory ; and finally, after several different ways had been tried, the best one was found to be to let the animals eat as much of the newly-cut chaff as they would, and then to throw a little spice, mixed with maize meal, over the remainder. It was found that the amount of spice thus taken by the bullocks averaged 1 oz. ($\frac{1}{16}$ lb.) only per head daily throughout the experiment. In the case of the locust-bean meal, after a few days' feeding the proportion of locust-bean meal was increased (December 8), and ¾ lb. of locust-bean meal and ¾ lb. of maize meal per head were daily given.

Of the molasses it was found that ¼ lb. per head daily was about the right quantity, the bullocks getting "loose" if more than this was given.

On December 22 the cake and corn were increased all round to 8 lb. per head daily—viz. linseed cake, 4 lb. ; decorticated cotton cake, 2 lb. ; maize meal, 2 lb. (Lots I., III., IV.) ; maize meal, 1 lb. ; locust-bean meal, 1 lb. (Lot II.). At the same time the hay was increased all round to 4 lb. per head daily ; on January 10, 1901, the hay was still further increased to 5 lb. per head daily in each lot. During this period, however, two of the bullocks (Nos. 7 and 8) in Lot II. (locust-bean meal) would not eat their roots properly, but, for a time, went completely off their feed.

On January 17, after giving the animals a limited ration first thing in the morning, their water having been removed over-night, they were all weighed. The results are given in Table IV. on pages 305 and 306.

From these results it will be seen that the gain from the ordinary feeding was as high as that of any of the others, the lowest gain being in Lot II. (locust bean). Two of the four bullocks in this lot, however, were those which had gone off their roots, and these showed an actual loss of weight. So far as live weight increase was concerned, this first part of the experiment left nothing to choose between the ordinary feeding and the addition to it of spice or of molasses.

The four lots then entered on the second period of the experiment. Swedes were now given half and half with mangels, and the cake and corn were increased to 10 lb. per head daily—viz. linseed cake, 4½ lb.; decorticated cotton cake, 3 lb.; and maize meal, 2½ lb. (Lots I., III., and IV.); while Lot II. had maize meal, 1¼ lb.; locust-bean meal, 1¼ lb.

On February 3 the hay was increased to 7 lb. per head daily, and after February 25 swedes were entirely replaced by mangels. The bullocks, more especially those fed on molasses, showing signs of "looseness," a little undecorticated cotton cake was given them. It was found that the bullocks in the yard (receiving spice and molasses respectively) would only eat about 1 lb. more hay and chaff per head daily than those in the boxes.

Mr. J. P. Terry, a member of the Chemical and Woburn Committee, visited the farm on several occasions, and finally, on March 11, selected the order in which the bullocks were to be sent to the butcher.

The dates of disposal were as follows:—

March 25 .	**Nos. 9, 10, 11, 12 (spice feeding).**
April 1 .	**„ 1, 2 (ordinary feeding), 6, 7 (locust-bean meal).**
April 8 .	**„ 13, 14, 15, 16 (molasses feeding).**
April 15 .	**„ 5 and 8 (locust-bean feeding).**
April 29 .	**„ 3 and 4 (ordinary feeding).**

The first twelve bullocks were sent to Bedford and the last four were killed locally. In all cases the usual precautions taken in these experiments at Woburn, to ensure accuracy of weights recorded, were observed. The bullocks were all sold by dead weight, and a uniform price of 4*s.* 4*d.* per stone was obtained. The examination of the carcasses did not bring out any point as to difference of feeding.

Full particulars as to weights, gains in live weight, carcass weights, &c., are given in Table IV. (pp. 305 and 306). The following is a summary of the main points:—

—	I. (Ordinary feeding)	II. (Locust-bean meal)	III. (Spice)	IV. (Molasses)
Average gain per head in whole period	281 lb.	229 lb.	226 lb.	253 lb.
Average carcass weight per head .	96 st. 1 lb.	92 st.	90 st. 4 lb.	95 st. 2 lb.
Average percentage of carcass weight to fasted live weight .	58·85	58·52	57·25	59·34

From these figures it will be seen that the greatest gain was with the ordinary feeding, and that the highest carcass weight was obtained here; but it has to be remembered that two of the beasts in this lot (3 and 4) went on feeding longer than the others, and hence more food would be consumed.

The lowest gain and lowest carcass weight were obtained with the spice lot (III.), but these were the ones that were first ready for the butcher and so consumed less food.

The gain of live weight and the carcass weight and percentage were very satisfactory in the case of the molasses (Lot IV.).

The lowest return was with Lot II. (locust-bean meal), but here, too, it must be remembered that two of the animals (7 and 8) went off their feed of roots during the first period and actually lost weight. No. 8, it is true, finished up quite as well as several others, but No. 7 never quite did so, and on this account it would be hardly fair to draw conclusions too finely as regards the use of locust-bean meal.

It becomes necessary now to see what quantities of food the several lots consumed during the whole experiment, the cost of this, and to set it against the return by sale of the carcasses.

Table I. gives the analyses of average samples of the different foods used. As usual, samples were taken each week and the monthly average of these analysed.

TABLE I.—*Analyses of Foods used by Bullocks in Feeding Experiment.*

—	Linseed cake	Decorticated cotton cake	Maize meal	Locust bean meal	Hay	Oat-straw chaff	Wheat-straw chaff	Swedes	Mangels
Moisture . . .	11·45	11·56	14·66	21·22	15·35	15·82	11·04	90·48	87·84
Oil (ether extract) .	15·70	15·25	3·53	—	2·69	2·55	1·70	—	—
[1] Albuminous compounds	31·75	40·81	10·18	6·59	9·89	3·28	7·00	·98	1·14
Mucilage, starch, sugar, &c.	29·26	20·97	67·87	64·71	42·50	39·41	37·93	6·87	9·19
Woody fibre . . .	7·05	4·78	1·91	5·09	23·09	32·45	30·73	1·07	·99
[2] Mineral matter (ash) .	4·79	6·63	1·85	2·39	6·48	6·49	11·60	·60	·84
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
[1] Containing nitrogen .	5·08	6·53	1·63	1·06	1·58	·52	1·12	·16	·18
[2] Including sand and silica . . .	·05	·42	·45	·16	2·36	1·98	7·96	—	—

The amounts of the various foods consumed are given in Table II.

TABLE II.—*Quantities of Food consumed by the respective Lots of Bullocks in Feeding Experiment (Whole Period).*

—	LOT I. (Ordinary feeding)				LOT II. (Locust-bean meal)				LOT III. (Spice)				LOT IV. (Molasses)			
	t.	c.	q.	lb.	t.	c.	q.	lb.	t.	c.	q.	lb.	t.	c.	q.	lb.
Swedes	4	15	2	14	4	9	2	0	4	16	2	14	4	16	2	14
Mangels . . .	4	3	2	17	3	17	3	3	2	17	2	0	3	15	0	0
Linseed cake . .	1	0	3	21		19	3	8		17	1	9		19	3	9
Decorticated cotton cake . . .		12	3	1		12	0	1		10	2	2		12	0	2
Maize meal . . .		10	2	26		5	1	22		9	1	13		10	2	13
Undecorticated cotton cake . . .		2	1	26		2	0	26		1	2	26		2	0	26
Hay chaff . . .		3	3	10		2	3	24			1	15		2	3	15
Wheat-straw chaff .			2	13			2	13			2	12			2	12
Oat-straw chaff . .	1	18	2	1	1	18	1	3	1	19	2	27	2	0	0	14
Hay	1	6	2	7	1	5	2	22	1	4	1	2	1	7	3	23
Locust-bean meal . .		—				5	0	18		—				—		
Molasses . . .		—				—				—				1	0	20
Spice		—				1	0	6		—				—		
Water	11	6	2	14	10	15	2	14	9	13	3	0	10	8	2	0

TABLE III.—*Cost of the Food consumed during the Whole Period by each Lot of Bullocks.*

—	Cost per ton (on farm)	LOT I. (Ordinary feeding)			LOT II. (Locust-bean meal)			LOT III. (Spice)			LOT IV. (Molasses)		
		£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£.	*s.*	*d.*
Roots[1] . .	Swedes 5/ Mangels 7/	2	19	0	2	9	0	2	4	0	2	10	0
Hay . . .	60/	4	10	0	4	7	0	3	13	0	4	11	0
Straw . . .	30/	2	18	6	2	18	0	3	0	0	3	1	0
Linseed cake .	£9 15*s.*	10	4	9	9	15	0	8	6	0	9	15	0
Decorticated cotton cake	£7 17*s.*	5	2	0	4	14	0	4	2	3	4	14	0
Maize meal . .	£6	3	4	6	1	12	3	2	15	0	3	4	6
Undecorticated cotton cake	£5 14*s.*		14	3		12	6		9	9	1	1	6
Locust-bean meal.	£6 12*s.*		—		1	15	0		—			—	
Spice . . .	1/ per lb.		—			—		1	14	0		—	
Molasses . .	¾*d.* per lb.		—			—			—			7	0
Total .	—	29	13	0	28	2	9	26	4	0	28	15	0

[1] Estimate.

TABLE IV.—*Live Weights of the Bullocks at each Period, Gains in Live Weights, Fasted Live Weights, Carcass Weights, &c.*

LOT I.—ORDINARY FEEDING.

No.	Live weights			Gain in			Fasted live weight	Carcass weight in stones of 8 lb	Percentage of carcass to fasted live weight
	Nov. 22, 1900	Jan. 17, 1901	April 1[1] April 29[2]	56 days	74 days[1] 102 days[2]	Total period			
	c. qr. lb.	c. qr. lb.	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st lb.	per cent.
1	10 0 14	10 3 7	12 2 15[1]	77	204[1]	281	11 3 27	97 0	57·77
2	10 2 5	11 1 4	12 2 20[1]	83	156[1]	239	12 0 10	102 6	60·71
3	8 1 23	9 0 18	11 2 21[2]	79	283[2]	362	11 0 14	91 1	58·50
4	9 3 24	10 2 1	12 0 12[2]	61	179[2]	240	11 1 23	93 5	58·37
Total .	39 0 10	41 3 2	49 0 12	300	822	1,122	46 2 18	384 4	—
				Average per head .		281	11 2 16	96 1	58·85

LOT II.—WITH LOCUST-BEAN MEAL ADDITIONAL.

No.	Live weights			Gain in			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass to fasted live weight
	Nov. 22, 1900	Jan. 17, 1901	April 1[1] April 15[2]	56 days	74 days[1] 88 days[2]	Total period			
	c. qr. lb.	c. qr. lb.	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st. lb.	per cent.
5	9 3 20	10 1 7	12 1 0[2]	43	217[2]	260	11 2 5	90 6	56·15
6	8 3 26	9 3 26	11 2 12[1]	112	182[1]	294	11 0 20	91 6	58·70
7	10 2 16	10 2 5	11 3 16[1]	−11	151[1]	140	11 1 7	94 6	59·66
8	9 2 9	9 1 19	11 2 8[2]	−18	241[2]	223	10 3 17	90 7	59·54
Total .	39 0 15	40 1 1	47 1 8	126	791	917	44 3 21	368 1	—
				Average per head .		229	11 0 26	92 0	58·52

TABLE IV. (*cont.*)—*Live Weights of the Bullocks at each Period, Gains in Live Weights, Fasted Live Weights, Carcass Weights, &c.*

LOT III.—WITH SPICE ADDITIONAL.

No.	Live weights			Gain in			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass to fasted live weight
	Nov. 22, 1900	Jan. 17, 1901	March 26	56 days	67 days	Total period			
	c. qr. lb.	c. qr. lb.	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st lb.	per cent.
9	10 1 23	10 3 17	12 1 4	50	155	205	11 2 22	91 1	55·65
10	9 3 4	10 2 7	11 3 0	87	133	220	11 1 17	91 7	57·55
11	9 1 24	10 0 17	11 2 21	77	172	249	11 0 22	90 7	57·97
12	9 1 19	10 0 18	11 1 26	83	147	230	10 3 12	88 0	57·89
Total .	39 0 14	41 3 3	47 0 22	297	607	904	45 0 17	361 7	—
				Average per head .		226	11 1 4	90 4	57·25

LOT IV.—WITH MOLASSES ADDITIONAL.

No.	Live weights			Gain in			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass to fasted live weight
	Nov. 22, 1900	Jan. 17, 1901	April 8	56 days	81 days	Total period			
	c. qr. lb.	c. qr. lb.	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st. lb.	per cent.
13	10 2 0	10 3 17	12 2 3	45	182	227	11 3 10	97 4	58·82
14	10 0 12	11 0 10	12 3 20	110	206	316	12 1 0	101 7	59·40
15	9 1 2	9 3 8	10 1 16	62	64	126	10 0 8	86 2	61·10
16	9 0 25	9 3 22	12 1 5	81	263	344	11 2 21	95 2	58·21
Total .	39 0 11	41 3 1	48 0 16	298	715	1,013	45 3 11	380 7	—
				Average per head .		253	11 1 24	95 2	59·34

The results may now be summarised thus :—

—	Lot I. (Ordinary feeding)			Lot II. (Locust-bean meal)			Lot III. (Spice)			Lot IV. (Molasses)		
	st.	lb.		st.	lb.		st.	lb.		st.	lb.	
Total carcass weight of four bullocks	384	4		368	1		361	7		380	7	
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Price realised at 4*s.* 4*d.* per st.	83	6	2	79	15	2	78	8	2	82	10	6
Less cost of food	29	13	0	28	2	9	26	4	0	28	15	0
Difference	£53	13	2	£51	12	5	£52	4	2	£53	15	6
Average gain in live weight per day	1·95 lb.			1·67 lb.			1·84 lb.			1·85 lb.		

CONCLUSIONS.

The result of this experiment is clearly to show that no case can be made out from it for any of the virtues supposed to belong to spice and condimental foods, but that bullocks will fatten just as well and as economically on a well-chosen mixture of ordinary foods. The average gain per head was higher with the ordinary feeding than with any of the others, and the money return practically as high too. Nor did it turn out that the use of the condiments enabled the bullocks to consume more bulky food like straw and hay chaff. Of the additional materials the best was molasses, this giving results practically equal to those of the ordinary feeding. There is, however, with its use a tendency to "looseness" in the animals, which must be checked by not giving it in too great a quantity. One pound per day of molasses among four bullocks was found to be about the limit.

Spice did not do so well as molasses, and though it is true that the animals fed with it were judged to be soonest ready for the butcher, their carcass percentage was the lowest of all, and the money return not so great in the end. The earlier bringing out was probably due to the individual animals rather than to their food. Judgment must, as explained, be withheld in respect to the use of locust-bean meal, owing to two of the bullocks fed on it being indisposed during part of the experiment, but there is nothing in the general results as regards the others, and the ultimate return from them, to warrant the belief that it would have shown better results than the ordinary feeding.

Lastly, it may be interesting to note (as the question of feeding bullocks in boxes as against open yards has often been raised in connection with the Woburn experiments) that the box-fed lot did quite as well as those in the yards.

III.—EARLY FEEDING OF MANGELS TO SHEEP; AND GORSE AS FOOD FOR SHEEP.

(*An Experiment conducted during the Winter* 1900–1901.)

THE Society's Journal, in the Volume for 1899, contained (pages 559-566) an account of a feeding experiment carried out during the winter of 1898–9, in which it was shown that mangels could quite well be given to fattening bullocks in the early stages of feeding, and without the previous use of turnips or swedes, provided that the mangels be given in moderation at first and that undecorticated cotton-cake, bean-meal, or a plentiful supply of long hay, be given as well. At the same time a small supplementary experiment with sheep was carried out, and showed that mangels could be, with similar limitations, quite well given to sheep, and did not cause "scouring" with them. It was resolved, however, to test the question more fully during the winter of 1900–1901. Also, as gorse had been successfully tried in 1898–9 for sheep,[1] it was decided to repeat the experiment. Accordingly, these two points, (1) the early feeding of mangels, and (2) the use of gorse, were combined in one experiment.

From a lot of 90 wether lambs of the Hampshire and Oxford cross, 48 were selected, and were divided into four pens of 12 sheep each. The lambs, taking the purchase price and expenses of carriage, cost 35*s*. 4*d*. per head. They had all been treated alike for some time before the experiment began. The feeding of the four pens was arranged as follows:—

PEN I.	PEN II.	PEN III.	PEN IV.
Mangels Gorse Linseed cake	Swedes Gorse Linseed cake	Swedes Meadow hay Linseed cake	Mangels Meadow hay Linseed cake

The experiment was begun on November 9, 1900, the sheep having been previously weighed at 12 noon, after receiving a limited feed of 6 lb. per head of roots the first thing in the morning. The weights at starting the experiment are given in Table III., on pages 312–315.

In all cases the roots were intended to be given *ad libitum*, also the hay and the gorse, linseed cake being fed at first at the rate of ½ lb. per head daily, to be gradually increased to 1 lb. At starting, Pens I. and IV. took 12 lb. of mangels per head daily with ¼ lb. of gorse or of hay chaff; Pen II. 15 lb. of swedes with ¼ lb. of gorse; and Pen III. 18 lb. of swedes with ¼ lb. of hay chaff.

It was soon found that the allowance of roots, especially of mangels, was too liberal at first, for the sheep began to get "loose," so the mangels were cut down in quantity to 9 lb. per head daily, and the swedes to 12 lb. in Pen II., and to 15 lb. in Pen III. To prevent "scouring," ¼ lb. of undecorticated cotton cake was substituted for ¼ lb. linseed cake. After this it was possible to increase the roots again, and, by carefully watching the sheep and regulating the quantity of roots as occasion required, the daily amount was gradually increased to 12 lb., 13½ lb., 15 lb., and finally on January 9 to 16½ lb. per head daily of mangels, and to 15 lb. and 16½ lb of swedes. At first the sheep in Pens I. and II. would eat very little gorse, so hay-chaff was mixed with it. By November 23 the sheep in Pens I. and II. would eat, per pen daily, 3 lb. of gorse with 1 lb. of hay, and this was gradually increased to 4½ lb. of gorse on December 3, 5 lb. on December 8, 7 lb. on December 16, 10 lb. on December 18, the hay chaff now being omitted altogether, and finally to 12 lb. per pen, or 1 lb. of gorse per head daily, on January 7. On December 22 the cake to all four pens was increased to ¾ lb. per head daily (two-thirds linseed cake, one-third undecorticated cotton cake).

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[1] See Journal R.A.S.E., Vol. for 1899, pp. 557–573.

On January 11th, after limited feeding of 6 lb. of roots per head and a little cake, the four pens were all weighed, about 10.30 A.M. The weights are given in Table III., on pages 312–315. No. 10 in Pen II. and No. 12 in Pen IV. are omitted from the record, as these sheep died during the later part of the experiment.

The highest gain, it will be seen, was in the case of Pen IV. (mangels and hay), the next best in Pen I. (mangels and gorse), and the lowest in Pen III. (swedes and hay). So far, therefore, the early feeding of mangels had not only done no harm to the sheep, but had given a better increase in live-weight. What "scouring" there had been at first was exhibited just as much with the swedes as with the mangels. For practical purposes the quantities of mangels and swedes eaten may be taken as the same. The gorse that the sheep ate during this period was from ¼ lb. per head daily at first, gradually increasing to 1 lb. per head at the close. The hay chaff in Pens III. and IV. was kept throughout to about ¼ lb. per head daily.

The sheep then passed on to the second period of the experiment, and the cake was increased all round to ⅔ lb. of linseed cake and ⅓ lb. undecorticated cotton cake per head daily, the hay chaff in Pen III. (swedes and hay) being also increased to about ⅓ lb. per head daily, while in Pen IV. (mangels and hay) it remained at ¼ lb.

During this second period the sheep in Pen I. took, per head daily, on an average, 16½ lb. of mangels and 1 lb. of gorse, those in Pen II. 15 lb. of swedes with 1 lb. of gorse, in Pen III. 16 lb. of swedes with ⅓ lb. hay chaff, and in Pen IV. 16½ lb. of mangels with ¼ lb. hay chaff. One sheep, No. 12 in Pen IV., died accidentally on February 9.

On February 18, after having had, the first thing in the morning, a limited feed of roots and cake, all the sheep were weighed at 10.30 A.M. Fifteen of them (eleven from Pen IV. and four from Pen I.) were sent to Aylesbury and killed on February 19, the usual precautions as to weighing being taken. The live weights of all the sheep, as also the fasted weights and carcass weights, are given in

Table III. The butcher pronounced the sheep of the first lot killed all beautifully ripe, and the carcass weights averaged 9½ stone in Pen IV., giving 53 per cent. of carcass to fasted live-weight. On looking at the gains in live-weight it will be seen that the relative increases were in exactly the same order as at the end of the first period, Pen IV. (mangels and hay) giving the highest gain, then Pen I. (mangels and gorse), while Pen II. (swedes and gorse) and Pen III. (swedes and hay) gave the lowest gain. One point requires to be borne in mind, viz., that while the mangels were, if anything, improving by being kept, the swedes were, on the other hand, deteriorating. But the result was to show that mangels could be used perfectly well in substitution for swedes, and that sheep could be fattened faster by them than by swedes. The question between gorse and hay was hardly determinable on these weights alone, but it was clear that gorse, in the absence of hay, could be used advantageously, and that sheep would get ripe on it nearly as soon as on meadow hay.

The remainder of the sheep were carried on until they were ripe for killing, but during this period a second sheep (No. 10 in Pen II.) was taken ill, suffering from catarrh; it was killed locally. Several of the sheep at this time showed signs of bad colds, etc., and they dropped off in their feeding.

On February 25 four more sheep of Pen I. and four of Pen II. were weighed and sent off. On March 11 the remaining four sheep of Pen I., four more of Pen II., and three of Pen III. were similarly weighed and despatched; while, finally, on March 18, the last three of Pen II. and the remaining 9 of Pen III. were weighed and disposed of, and the experiment came to an end. The full results are given in Table III. On the sheep being killed, the butcher observed that those of Pen II. (swedes and gorse) were not nearly as ripe as those of Pen I. (mangels and gorse), there being an absence of the "bloom" noticeable on the skins of the animals in Pen I.

The sheep were sold by dead weight. The prices obtained varied slightly from time to time, ranging from 5*s.* 4*d.* to 5*s.* 6*d.* per stone. The comparison is made on an average price of 5*s.* 5*d.* per stone.

Table I. gives the total weights of food consumed by each lot of sheep during the entire period.

TABLE I.—*Foods consumed by Sheep during entire Experiment.*

—	PEN I. (12 sheep)				PEN II. (11 sheep)				PEN III. (12 sheep)				PEN IV. (11 sheep)			
	t.	c.	q.	lb.	t.	c.	q.	lb.	t.	c.	q.	lb.	t.	c.	q.	lb.
Mangels . .	8	11	1	12	—				—				8	0	3	14
Swedes . .	—				9	12	0	24	11	1	1	6	—			
Gorse . . .	0	8	2	3	0	9	1	15	—				—			
Hay chaff . .	0	0	1	15	0	0	1	6	0	3	2	12	0	2	2	18
Linseed cake .	0	5	2	14	0	6	0	15	0	6	2	5	0	4	3	18
Cotton cake .	0	3	1	3	0	3	2	3	0	3	2	26	0	2	3	18

The cost of the various foods was :—

Linseed cake	per ton	£9 15*s.* 0*d.*	on farm.
Cotton cake	,,	£5 14*s.* 0*d.*	,,
Hay chaff (estimated)	,,	£3 0*s.* 0*d.*	,,
Mangels ,,	,,	£0 7*s.* 0*d.*	,,
Swedes ,,	,,	£0 5*s.* 0*d.*	,,
Gorse ,,	,,	£0 8*s.* 6*d.**	,,

* The only datum for reckoning the value of the gorse was that some of the gorse was subsequently sold to a neighbouring farmer at 3*s.* for a load of about 7 cwt., thus making about 8*s.* 6*d.* per ton.

The average composition of the foods is set out in Table II.

TABLE II.—*Average Composition of Foods used by Sheep.*

—	Linseed cake	Undec. cotton cake	Meadow hay chaff	Gorse	Mangels	Swedes
Moisture	13·95	13·75	16·49	63·12	88·11	90·45
Oil (ether extract) . .	12 76	5·06	2·57	1·09	—	—
*Albuminous compounds .	32·86	23·79	8·64	4·39	1·12	1·01
Mucilage, soluble carbohydrates, digestible fibre, &c.	28·57	32·58	39·50	13·19	8·89	6·90
Woody fibre	6·67	19·54	25·82	16·05	·96	1·04
†Mineral matter . . .	5·19	5·28	6·98	2·16	·92	·60
	100 00	100·00	100·00	100·00	100·00	100·00
*containing Nitrogen . .	5·34	3·81	1·46	·70	·18	·16
† ,, sand . . .	·54	·32	2·60	·84	—	—

Samples of all the foods were, as usual, taken every week, and the average samples analysed every month. In connection with the gorse it may be of interest to refer to the Society's Journal, Volume for 1899, page 571, where analyses are given of the gorse as cut at different stages of its growth.

The main features of Table III. may be summarised thus :—

—	Pen I. (Mangels and Gorse)	Pen II. (Swedes and Gorse)	Pen III. (Swedes and Hay)	Pen IV. (Mangels and Hay)
Average gain per head in whole period . . .	$35\frac{5}{8}$ lb.	$32\frac{4}{11}$ lb.	$33\frac{1}{4}$ lb.	$39\frac{4}{11}$ lb.
Average carcass weight per head	9 st. $2\frac{1}{2}$ lb.	8 st. 7 lb.	9 st. 2 lb.	9 st. 4 lb.
Average percentage of carcass to live weight . . .	53·25	52·36	53·29	52·93

TABLE III.—*Live Weight of the Sheep, in the Wool, at each Period, Gains in Live Weight, Fasted Live Weight, Carcass Weight, &c.*

PEN I.—SHEEP ON MANGELS AND GORSE.

No.	Live weight				Gain in live weight			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass weight to fasted live weight
	Nov. 9, 1900	Jan. 11, 1901	Feb. 18	Feb. 26,[1] and March 11[2]	In 63 days	In 38 days	Total period			
	c. qr. lb.	c. qr. lb.	c. qr. lb.	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st. lb.	per cent.
1	1 0 6	1 1 6	1 2 4	—	28	26	54	1 1 22	10 3	51 23
2	1 0 3	1 0 22	1 1 7	1 1 18[2]	19	13	38	1 1 6	9 7	54·10
3	1 0 3	1 0 14	1 1 3	1 1 6[2]	11	17	31	1 1 0	9 3	53·57
4	1 0 2	1 0 18	1 1 8	1 1 6[1]	16	18	32	1 0 26	9 4	55·07
5	1 0 1	1 0 25	1 1 13	1 1 11[1]	24	16	38	1 1 2	9 3	52 82
6	1 0 0	1 0 16	1 0 22	1 0 21[1]	16	6	21	1 0 13	8 7	56 80
7	1 0 0	1 0 23	1 1 11	1 1 11[1]	23	16	39	1 1 4	9 5	53·47
8	0 2 26	1 0 9	1 0 25	1 0 22[2]	11	16	24	1 0 16	8 5	53·90
9	0 3 25	1 0 16	1 1 3	1 0 26[2]	19	15	29	1 0 20	8 6	53·03
10	0 3 24	1 0 23	1 1 8	—	27	13	40	1 1 3	9 1	51·05
11	0 3 21	1 0 22	1 1 9	—	29	15	44	1 1 1	9 3	53·19
12	0 3 19	1 0 16	1 1 3	—	25	15	40	1 0 26	8 7	51·45
Total (21 sheep) .	11 3 18	14 0 14	15 3 4	—	248	186	430	14 3 27	111 6	—
Average per head	0 3 27	1 0 20	1 1 8	—	20⅔	15½	35⅚	1 1 0	9 2½	53·25

TABLE III. (*continued*).—*Live Weight of the Sheep, in the Wool, at each Period, Gains in Live Weight, Fasted Live Weight, Carcass Weight, &c.*

PEN II.—SHEEP ON SWEDES AND GORSE.

No.	Live weight				Gain in live weight			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass weight to fasted live weight
	Nov. 9, 1900	Jan. 11, 1901	February 18	February 25[1] March 11[2] March 18[3]	In 63 days	In 38 days	Total period			
	c. qr. lb.	c. qr. lb.	c. qr. lb.	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st. lb.	per cent.
1	1 0 6	1 0 25	1 1 12	1 1 14[1]	19	15	36	1 1 5	9 3	51·72
2	1 0 4	1 0 14	1 0 27	1 1 6[3]	10	13	30	1 0 26	9 2	53·63
3	1 0 2	1 0 19	1 1 4	1 0 27[1]	17	13	25	1 0 19	8 3	51·14
4	1 0 2	1 0 13	1 0 27	1 1 3[3]	11	14	29	1 0 25	9 2	54·01
5	1 0 1	1 0 25	1 1 13	1 1 17[1]	24	16	44	1 1 7	9 5	52·38
6	1 0 0	1 0 15	1 1 0	1 1 5[2]	15	13	33	1 0 26	9 2	53·62
7	0 3 18	1 0 5	1 0 14	1 0 16[3]	15	9	26	1 0 11	7 7	51·22
8	0 3 27	1 0 20	1 1 8	1 1 10[2]	21	16	39	1 1 3	9 3	52·44
9	0 3 25	1 0 17	1 0 27	1 1 1[1]	20	10	32	1 0 21	8 2	49·62
10	—	—	—	—	—	—	—	—	—	—
11	0 3 21	1 0 6	1 0 23	1 1 2[2]	13	17	37	1 0 21	9 0	54·13
12	0 3 19	1 0 12	1 0 18	1 0 16[2]	21	6	25	1 0 9	7 7	52·06
Total (11 sheep)	10 3 13	12 2 3	13 3 5	—	186	142	356	13 1 5	97 4	—
Average per head	0 3 27	1 0 16	1 1 0½	—	17	13	32$\frac{4}{11}$	1 0 23	8 7	52·36

Table III. (*continued*).—*Live Weight of the Sheep, in the Wool, at each Period, Gains in Live Weight, Fasted Live Weight, Carcass Weight, &c.*

PEN III.—SHEEP ON SWEDES AND HAY.

No.	Live weight				Gain in live weight			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass weight to fasted live weight
	Nov. 9, 1900	Jan. 11, 1901	February 18	March 11[1] March 18[2]	In 68 days	In 38 days	Total period			
	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	lb.	lb.	lb.	c. q. lb.	st. lb.	per cent.
1	1 0 5	1 0 15	1 0 21	1 0 27[2]	10	6	22	1 0 18	8 7	54 61
2	1 0 5	1 0 24	1 1 13	1 1 19[1]	19	17	42	1 1 13	10 2	53·59
3	1 0 2	1 0 10	1 0 22	1 0 23[2]	8	12	21	1 0 18	9 0	55·31
4	1 0 2	1 1 0	1 1 13	1 1 23[2]	26	13	49	1 1 17	10 3	52·86
5	1 0 1	1 0 17	1 1 13	1 1 13[2]	16	24	40	1 1 10	10 1	54·00
6	1 0 0	1 0 9	1 0 21	1 1 3[2]	9	12	31	1 0 25	9 2	54·01
7	0 3 27	1 0 17	1 1 5	1 1 7[1]	18	16	36	1 1 0	8 7	50 71
8	0 3 27	1 0 14	1 1 1	1 1 0[1]	15	15	29	1 0 25	9 2	54·01
9	0 3 25	1 0 9	1 0 8	1 0 17[2]	12	−1	20	1 0 11	8 2	53·67
10	0 3 22	1 0 9	1 0 26	1 0 27[2]	15	17	33	1 0 19	8 1	49·62
11	0 3 21	1 0 6	1 0 22	1 0 27[2]	13	16	34	1 0 21	9 0	54·13
12	0 3 19	1 0 10	1 0 24	1 1 5[2]	19	14	42	1 0 26	9 1	52·90
Total (12 sheep)	11 3 16	13 2 0	14 3 21	—	180	161	399	14 3 7	110 4	—
Average per head	0 3 27	1 0 14	1 0 27½	—	15	$13\frac{5}{12}$	33¼	1 0 26	9 2	53·29

TABLE III. (*continued*).—*Live Weight of the Sheep, in the Wool, at each Period, Gains in Live Weight, Fasted Live Weight, Carcass Weight, &c.*

PEN IV.—SHEEP ON MANGELS AND HAY.

No.	Live weight			Gain in live weight			Fasted live weight	Carcass weight in stones of 8 lb.	Percentage of carcass weight to fasted live weight
	Nov. 9, 1900	Jan. 11, 1901	February 18	In 63 days	In 38 days	Total period			
	c. qr. lb.	c. qr. lb	c. qr. lb.	lb.	lb.	lb.	c. qr. lb.	st. lb.	per cent.
1	1 0 5	1 0 20	1 1 6	15	14	29	1 1 1	9 4	53·90
2	1 0 5	1 0 22	1 1 13	17	19	36	1 1 5	9 6	53·79
3	1 0 3	1 0 23	1 1 11	20	16	36	1 1 4	9 6	54·17
4	1 0 1	1 0 24	1 1 14	23	18	41	1 1 5	9 6	53·79
5	1 0 1	1 1 0	1 1 15	27	15	42	1 1 6	9 2	50·68
6	1 0 0	1 0 27	1 1 13	27	14	41	1 1 6	9 6	53·43
7	0 3 27	1 0 20	1 1 15	21	23	44	1 1 7	9 4	51·70
8	0 3 27	1 0 22	1 1 11	23	17	40	1 1 4	9 4	52·78
9	0 3 25	1 0 6	1 0 24	9	18	27	1 0 16	8 5	53·90
10	0 3 21	1 0 23	1 1 15	30	20	50	1 1 6	9 4	52·05
11	0 3 21	1 0 22	1 1 14	29	20	49	1 1 8	9 5	52·03
12	—	—	—	—	—	—	—	—	—
Total (11 sheep)	10 3 24	13 0 13	14 3 11	241	194	435	14 0 12	104 4	—
Average per head	0 3 27¼	1 0 21½	1 1 11 2/11	22	17 7/11	39 6/11	1 1 3½	9 4	52·93

The cost of the food consumed during the whole experiment was :—

—	Pen I. (12 sheep)			Pen II. (11 sheep)			Pen III. (12 sheep)			Pen IV. (11 sheep)		
	£	*s.*	*d*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Linseed cake	2	14	10	2	19	0	3	3	0	2	8	9
Cotton cake	0	18	8	1	0	0	1	1	0	0	17	6
Hay	0	1	2	0	1	2	0	10	9	0	8	0
Gorse	0	3	7	0	3	10		—			—	
Mangels	2	19	9		—			—		2	16	0
Swedes		—			8	0	2	15	3		—	
	6	18	0	6	12	0	7	10	0	6	10	3
Add initial cost of sheep at 35*s.* 4*d.* per head	21	4	0	19	8	8	21	4	0	19	8	8
	28	2	0	26	0	8	28	14	0	25	18	11
Amount realised by sale at 5*s.* 5*d.* per stone	30	5	4	26	8	1	29	18	6	28	6	0
Gain	2	3	4	0	7	5	1	4	6	2	7	1

CONCLUSIONS.

From these figures it comes out clearly that the feeding with mangels did better than that with swedes, and this whether hay or gorse was used. Of the two latter, hay was rather better than gorse. It is true that the cost of the gorse was put down at 8*s.* 6*d.* per ton, whereas it cost practically nothing to grow, it being sown on a very poor strip of land on the farm which would not carry any ordinary crop. On the other hand, the preparation of it for use requires special machinery. It was crushed by a Gorse Masticator, made by McKenzie of Cork. In the feeding with swedes the gorse was not as successful as the hay, and where, as with sheep, only a small amount of hay chaff is used, the difference of cost between the hay and the gorse used is not sufficient to make the gorse remunerative. It would be necessary for the sheep to take a considerably larger proportion of gorse than the 1 lb. per head daily that they ate here to make the difference appreciable. In the experiment of 1898–9 it was found that 1 lb. of gorse would successfully replace 2 lb. of roots; in the present experiment 1 lb. of gorse did not replace $\frac{1}{4}$ lb. of hay chaff with any advantage.

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THE WOBURN POT-CULTURE EXPERIMENTS.

PAGE
I. POT-CULTURE EXPERIMENTS OF 1900 317
THE HILLS EXPERIMENTS 317
1. *The Influence of Lithium Chloride on Wheat* 318
2. *The Influence of Lithium Chloride on Barley* 324
3. *The Soaking of Seed Wheat in Solutions of Sodium Iodide, Sodium Bromide, and Sodium Chloride* 326
4. *The Soaking of Seed Barley in Solutions of Sodium Iodide, Sodium Bromide, and Sodium Chloride* 328
MISCELLANEOUS POT-CULTURE EXPERIMENTS 329
1. *Thick* v. *Thin Sowing of Barley* 329
2 *Hard and Soft Wheat* 332
II. EXPERIMENTS IN WEED PREVENTION 334
1. WILD POPPY (*Papaver Rhœas*) 334
2 WILD OATS (*Avena fatua*) 336
3. WILD ONION (*Allium vineale*) 336
4. ANNUAL CHRYSANTHEMUM (*Chrysanthemum Segetum*) . . 340

I. POT-CULTURE EXPERIMENTS OF 1900.

THE last Volume of the Society's Journal (1900) contains (pp. 553–604) a detailed account of the inception of the Woburn Pot-culture Station, the utility and methods of pot-culture experiments, the buildings and equipment of the Woburn Station, and, also, a Report on the first two years' work, 1898 and 1899. The present article continues the account of the experiments, covering those conducted in 1900. The experiments, it will be remembered, are divided into two sections. Firstly, the Hills Experiments, or those carried on under the bequest of the late Mr. E. H. Hills; and secondly, Miscellaneous Experiments.

THE HILLS EXPERIMENTS.

These experiments, it may be remembered, are on the use of the "rarer forms of ash" in agriculture. The experiments of the first year were of a tentative character, some compound of each of the six elements (fluorine, manganese, iodine, bromine, titanium, and lithium) mentioned by the late Mr. Hills being used, in order to get some idea as to the direction in which to push closer inquiry in future years. The results as regards the action of salts of iodine, bromine, and lithium were the most striking of those shown. As the outcome of this, attention was directed in the second year (1899) to the influence of iodine and bromine used in different quantities. Speaking generally, the results of the first year (1898) were: When sodium iodide was applied to crops of wheat or barley, at the rate of 5 cwt. per acre, its effect was to kill the plants; sodium bromide at the same rate seemed, at first, to do no harm, but subsequently weakened the plant, checked the growth of the roots, and reduced the yield of corn; lithium chloride, on the other hand, used at the same rate, had a retarding action at first, but from this the plant seemed, later on, to recover.

With cruciferous crops, lithium chloride, at the rate of 5 cwt. per acre, entirely prevented the growth, sodium iodide almost entirely so, while sodium bromide, though not appearing to do injury at first, did so in the end. Similar results to the last named were obtained with leguminous crops. The general results of the second year (1899) were: With cereals, sodium iodide and sodium bromide, applied at the rate of 2 cwt., 1 cwt., or even ½ cwt. per acre, had a harmful effect, alike when put on at the time of sowing or when top-dressed later, the injury increasing with the quantity used. The action with sodium bromide was less marked at first than with sodium iodide. In either case the effect was to check root development. Soaking the seed in 1 per cent. solutions of these two salts appeared, however, to have a beneficial effect. In the case of clover, both sodium iodide and sodium bromide, at the rate of 2 cwt. per acre only, were hurtful to the crop, the effect being more marked with the iodide. Soaking the seed in a 1 per cent. solution of either salt seemed, as with cereals, to be productive of some benefit.

Iodine and bromine compounds having to some extent been studied in the two years, 1898–1899, a return was made in 1900 to the third member, lithium, which had given peculiar results in the first year, and it was decided to institute a comparison of the effects of lithium chloride on wheat and barley with those of potassium chloride and sodium chloride.

There was little alteration in 1900 from the general procedure already set out in the last report, with the exception that the plan of soaking the seed in warm water (52°–56° C.) for ten minutes, as a prevention against "smut," is now always adopted. Also, the plants are now kept in the open as much as possible, and are only run in under cover when necessary through frost or storm.

1. *The Influence of Lithium Chloride on Wheat.*

The variety grown was "White-chaffed Browick." Twelve seeds, carefully selected so as to be of as nearly equal weight and kind in each pot, were sown in each of thirty-nine earthenware pots on December 1, 1899, each set being in triplicate. The soil used was that from Stackyard Field. The plan of treatment decided upon was:—

3 pots untreated.
3 „ lithium chloride, at the rate of 2 cwt. per acre, at sowing.
3 „ „ „ „ „ „ „ 1 „ „ „ „ „
3 „ „ „ „ „ „ „ ½ „ „ „ „ „
3 „ seed soaked for 10 minutes in a 1 per cent. solution of lithium chloride.
3 „ potassium chloride, at the rate of 2 cwt. per acre, at sowing.
3 „ „ „ „ „ „ „ 1 „ „ „ „ „
3 „ „ „ „ „ „ „ ½ „ „ „ „ „
3 „ seed soaked for 10 minutes in a 1 per cent. solution of potassium chloride.
3 „ sodium chloride, at the rate of 2 cwt. per acre, at sowing.
3 „ „ „ „ „ „ „ 1 „ „ „ „ „
3 „ „ „ „ „ „ „ ½ „ „ „ „ „
3 „ seed soaked for 10 minutes in a 1 per cent solution of sodium chloride.

The salts were dissolved in 150 c.c. (cubic centimetres) of distilled water and applied to the surface of the soil. The young plants came up rather irregularly, and some transplanting had to be done. Eventually, of the twelve seeds originally sown in each pot, six were allowed to remain as plants.

The first noticeable difference shown was in the case of the heavy (2 cwt. per acre) application of lithium chloride, which distinctly retarded germination, and the plants were late in coming up, and looked weakly. The application of ½ cwt. per acre of lithium chloride did not seem to have this influence, and the seed-soaking was, if anything, better than no treatment. The potash and soda series, however, looked, as a whole, better than the lithium one. By May 1900 the application of 2 cwt. of lithium chloride still showed a weakly appearance in the crop, especially in the straw, and these same sets in the middle of June were short in the straw as compared with the others, though the ear was good. The seed-soaking, whether with lithium, potassium, or sodium, gave the longest straw.

The various crops were measured, both as regards length of straw and length of ear, photographed, and then cut, the corn being dried and weighed, and also the straw.

Figs. 1, 2 and 3, on page 320, illustrate the relative effects of the different applications.

It was noticeable that not only was the straw of the pots treated with 2 cwt. lithium chloride short, but the grain was very irregular, and irregularly arranged in the ear. The following Table gives the results as regards length of straw

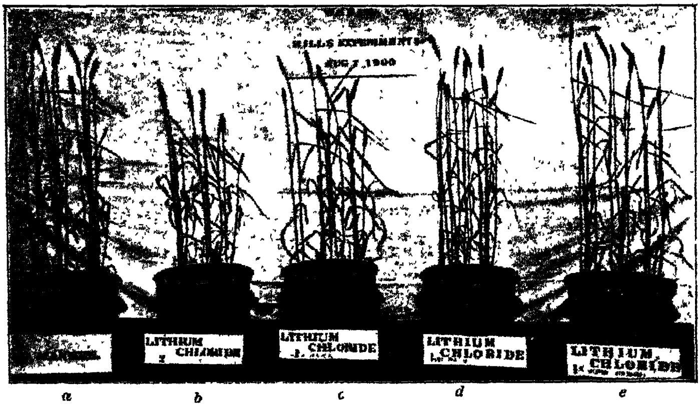


FIG. 1.—Lithium Chloride on Wheat. (*a*) No treatment, (*b*) 2 cwt. per acre Lithium Chloride, (*c*) 1 cwt., (*d*) ½ cwt., (*e*) seed soaked in 1 per cent. solution

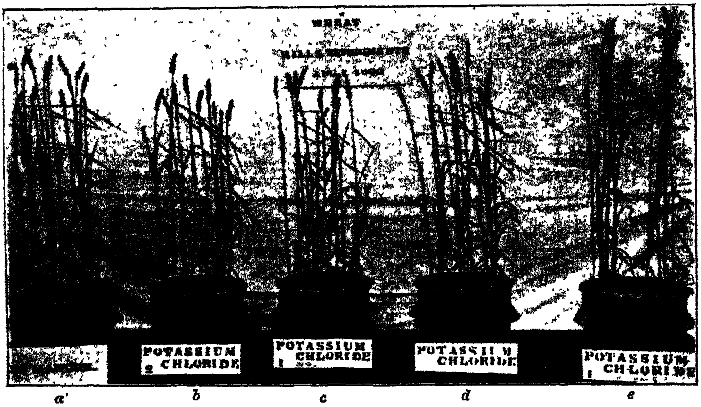


FIG. 2.—Potassium Chloride on Wheat. (*a*) No treatment, (*b*) 2 cwt. per acre Potassium Chloride, (*c*) 1 cwt., (*d*) ½ cwt., (*e*) seed soaked in 1 per cent. solution.

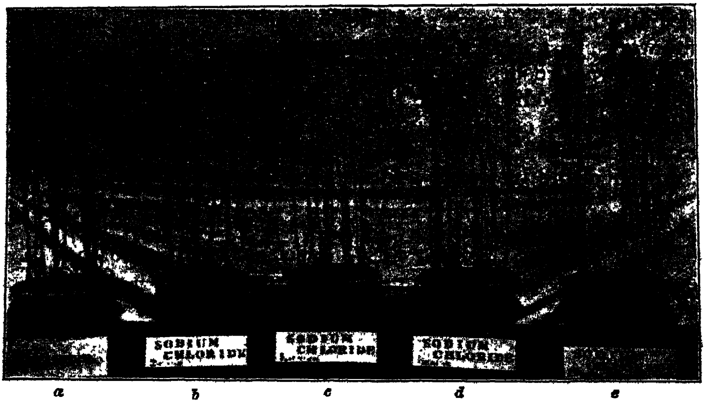


FIG. 3.—Sodium Chloride on Wheat. (*a*) No treatment, (*b*) 2 cwt. per acre Sodium Chloride, (*c*) 1 cwt., (*d*) ½ cwt., (*e*) seed soaked in 1 per cent. solution.

and ear, and the proportion of corn and straw in terms of the produce of the untreated pots, these latter being taken as 100. In each case the average of the three pots is given :—

—	Length of straw	Length of ear	Weight of corn	Weight of straw
	inches	inches	per cent. of untreated crop	per cent. of untreated crop
1. Untreated	27·27	3·28	100·0	100·0
2. Lithium Chloride, 2 cwt. . .	21·07	3·26	82·8	79·3
3. „ „ 1 cwt. . .	22·53	3·15	95·1	90·5
4. „ „ ½ cwt. . .	24·90	3·08	102·6	97·8
5. „ „ seed soaked .	25·76	3·12	102·8	107·4
6. Potassium Chloride, 2 cwt. . .	24·20	3·18	101·8	101·6
7. „ „ 1 cwt. . .	24·30	3·14	103·3	101·3
8. „ „ ½ cwt. . .	25·74	3·14	100·1	104·5
9. „ „ seed soaked .	27·46	3·16	102·3	107·0
10. Sodium Chloride, 2 cwt. . .	24·97	3·23	106·8	104·4
11. „ „ 1 cwt. . .	25·39	3·07	105·2	103·1
12. „ „ ½ cwt. . .	26·76	3·08	105·5	106·5
13. „ „ seed soaked .	25·73	2·88	99·4	104·2

The striking feature with regard to the lithium chloride is that the length of straw, the weight of corn, and weight of straw all go up as the amount of lithium chloride is reduced.

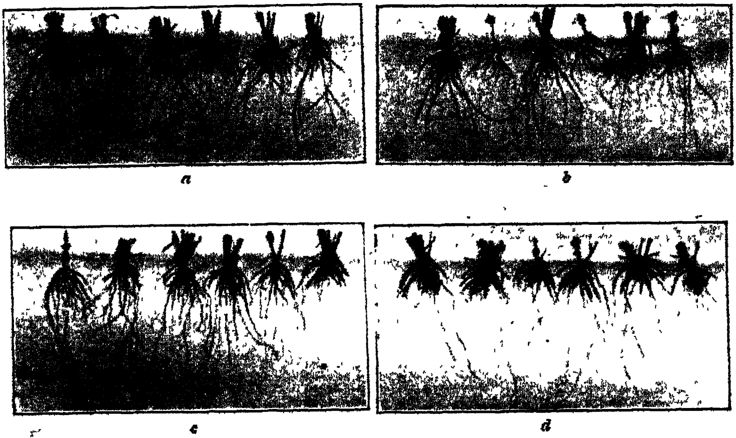


FIG. 4.—Lithium, Potassium, and Sodium Chlorides on Wheat-roots of Wheat plant after (*a*) no treatment, (*b*) 2 cwt. per acre Lithium Chloride, (*c*) 2 cwt. per acre Potassium Chloride, (*d*) 2 cwt. per acre Sodium Chloride.

The soaking of the seed in a 1 per cent. lithium chloride solution gave more corn and straw than the untreated lots, but not better results than the soaking of the seed in potassium chloride. The

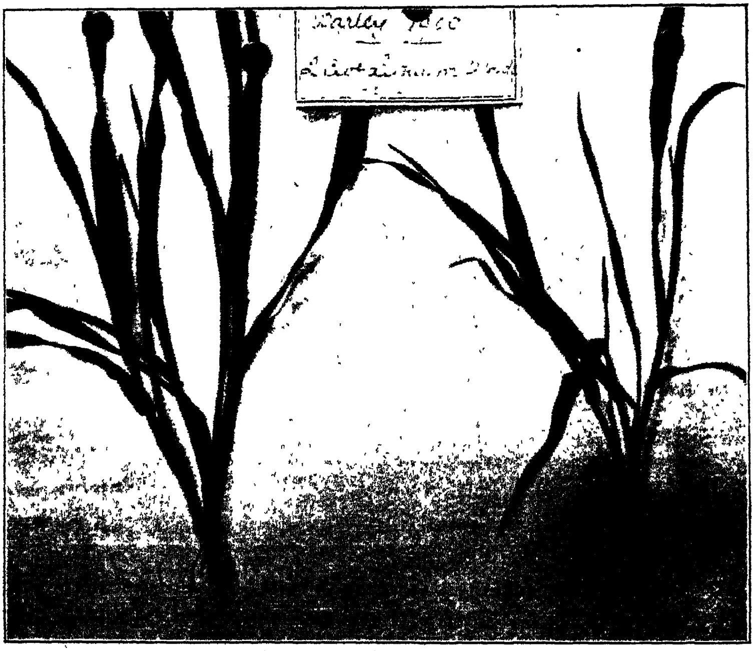


FIG. 5.—Lithium Chloride on Barley, 2 cwt. per acre. (See page 325.)

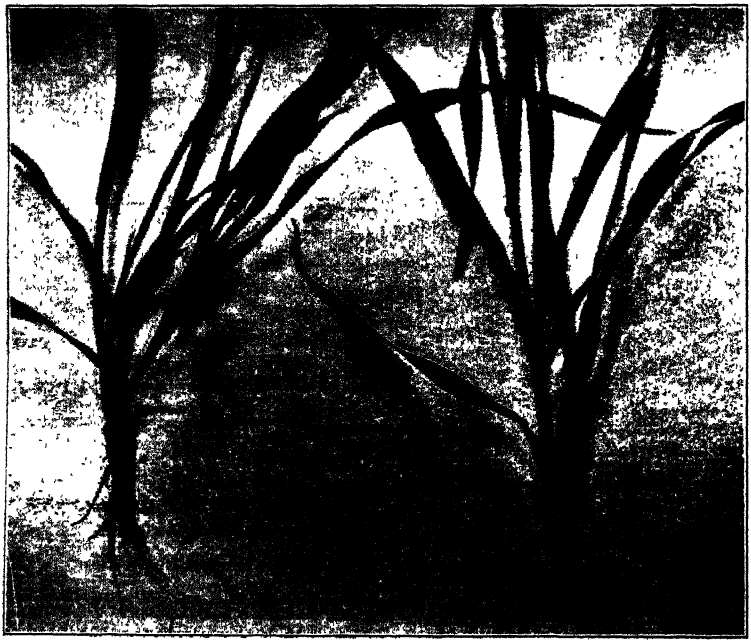


FIG. 6.—Lithium Chloride on Barley, 1 cwt. per acre. (See page 325.)

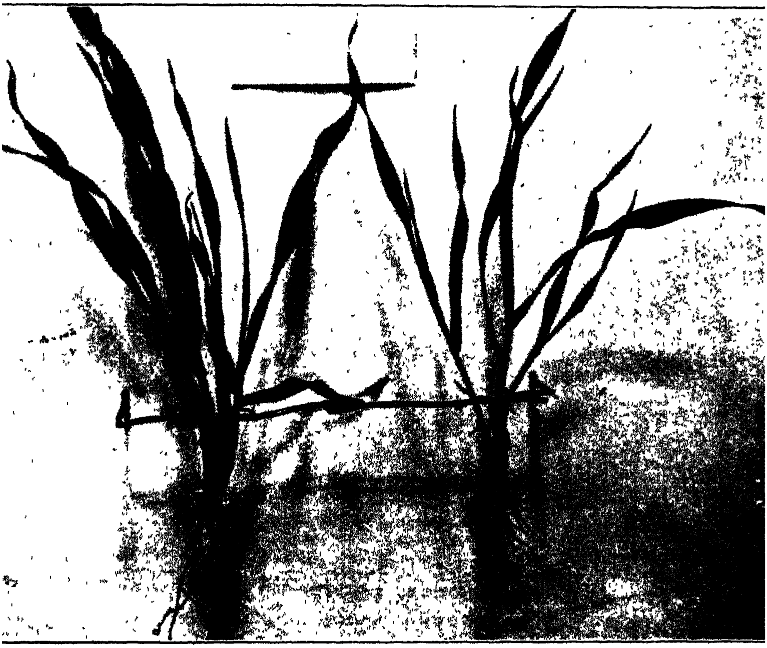


FIG. 7.—Lithium Chloride on Barley, seed soaked in 1 per cent. solution. (See page 325.)

potash applications, as a class, slightly increased both corn and straw, but the applications of sodium chloride gave even better

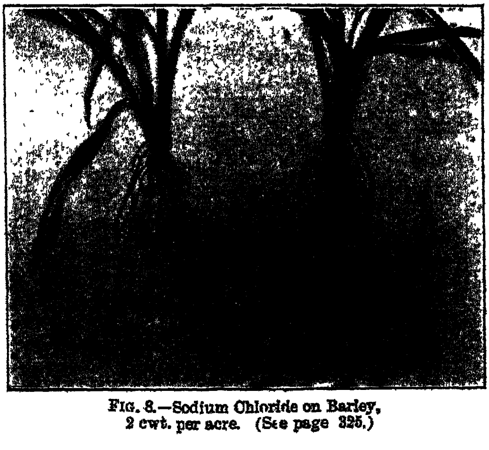


FIG. 8.—Sodium Chloride on Barley, 2 cwt. per acre. (See page 325.)

returns on the whole. The roots of the different sets were subsequently examined, and the results are interesting as regards the application of 2 cwt. per acre of the different salts. Fig. 4 (page 321) shows clearly the retarding influence of lithium chloride, the roots of several plants in (*b*) being very stunted.

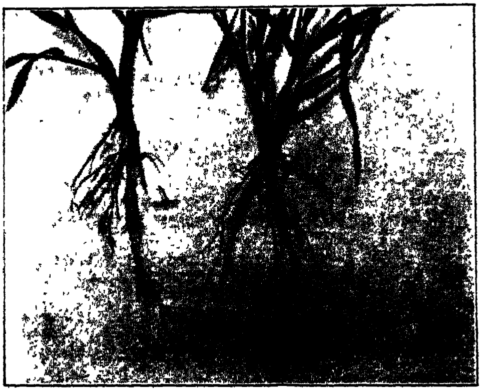


FIG. 9.—Sodium Chloride on Barley, 1 cwt. per acre. (See page 325.)

The general conclusions as regards wheat are:—

1. That lithium chloride tends to retard germination, to produce a shorter and weaker straw, and to give a less yield of corn, and this influence is the more marked the larger the amount of lithium salt used.

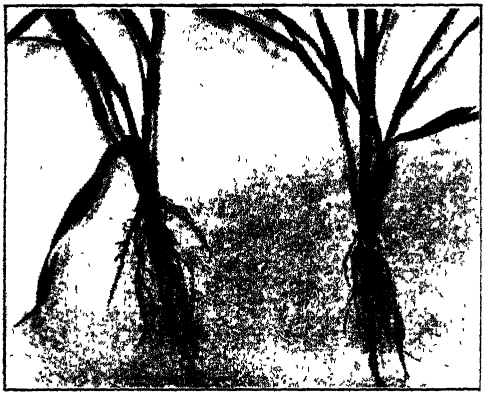


FIG. 10.—Sodium Chloride on Barley, seed soaked in 1 per cent. solution. (See page 325.)

2. That, as compared with potassium and sodium chloride, lithium chloride is distinctly inferior.

2. *The Influence of Lithium Chloride on Barley.*

A similar series of experiments to those just recorded for wheat was made with barley. The only differences were that zinc pots instead of earthenware ones were now used, and that the experiments were in duplicate, and not in triplicate.

The soil was the same- from Stackyard Field. The barley was sown on April 23, twelve seeds in each pot, reduced later to six plants in each pot. The several applications were the same as in the case of wheat.

It has been previously noticed that germination takes place more quickly in the zinc than in the earthenware pots—there is about three days' difference between the two.

So far as appearance went, there was at first no difference to speak of between the effects of the various applications, and, notably, the heavy dressing (2 cwt. per acre) of lithium chloride had not the retarding effect which it showed with wheat. Nor was there any difference noticeable as regards the foliage. But, on removing surplus plants for the purpose of thinning the crop, there were remarkable differences shown, which are best illustrated by figs. 5 to 10, in which the relative action of lithium and sodium chlorides is compared (see pages 322–324).

It will be noticed that where the heavy dressing of lithium chloride had been given (fig. 5) the main root was short and thick, the rootlets were short and stunted, and bearing but few root-hairs; this was also marked, though in a less degree, where the dressing of 1 cwt. lithium chloride had been used (fig. 6), whereas the seed soaked in lithium chloride solution had more fine rootlets and root-hairs (fig. 7). Comparing these with the roots from plants treated with potassium chloride and sodium chloride, it was found that these salts gave in all cases, especially the soda salt, well-developed and abundant roots (figs. 8, 9, 10). The appearances presented by the roots where lithium chloride was used are the more remarkable seeing that the part above ground showed no difference, the stems being just as long, and apparently as flourishing. Moreover, it will be remembered that in the case of wheat there was distinct retarding of growth and shortening of straw.

The barley was in ear by July 14, and the crop, after measurements of straw and ear had been made, was cut on August 20.

The results, given in the same form as for the wheat, were as follows :—

—	Length of straw	Length of ear	Weight of corn	Weight of straw
	inches	inches	per cent. of untreated crop	per cent. of untreated crop
1. Untreated	13·70	2·37	100·0	100·0
2. Lithium chloride, 2 cwt.	13·15	2·10	60·1	114·7
3. „ „ 1 cwt.	13·30	2·04	85·8	102·
4. „ „ ½ cwt.	13·05	2·06	80·4	92·5
5. „ „ seed soaked	13·10	2·07	93·8	88·3
6. Potassium chloride, 2 cwt.	14·15	2·00	92·6	97·3
7. „ „ 1 cwt.	12·65	2·07	91·9	99·5
8. „ „ ½ cwt.	13·15	2·02	90·2	99·1
9. „ „ seed soaked	13·70	2·18	94·9	97·0
10. Sodium chloride, 2 cwt.	13·41	1·95	97·2	106·5
11. „ „ 1 cwt.	14·10	2·00	93·4	94·0
12. „ „ ½ cwt.	12·95	1·85	90·8	100·0
13. „ „ seed soaked	12·80	1·98	89·3	90·0

The results are most striking as regards the influence of lithium chloride. While no retarding influence was noticeable, as was the case with wheat, and while the length of straw, and the produce of it, were practically equal to those of no treatment, the roots showed marked differences, being stunted and much devoid of root-hairs, and the reduction in weight of corn was very large. Also, it will be seen that the weight of straw produced was less according as less lithium chloride was used, this, again, being the reverse of what was noted with wheat. As regards corn produced, the same conclusion was come to as with wheat, viz. that a reduction was brought about.

The relative results of the application of potassium and sodium chlorides do not bring out any particular point.

The general conclusions as regards barley are:—

1. That lithium chloride tends to check root growth, and though, unlike the wheat, this is not shown in appearance or length of straw, it is evident in the considerably reduced yield of corn, lithium chloride having clearly a detrimental influence on the barley crop.

2. That lithium chloride is, as an application to barley, less desirable than either potassium or sodium chloride.

3. *The Soaking of Seed Wheat in solutions of Sodium Iodide, Sodium Bromide, and Sodium Chloride.*

The experiments of 1899 having given results which appeared in some instances to favour the soaking of wheat seed, previous to sowing, in solutions of sodium iodide and sodium bromide, it was decided to carry out further experiments on this point, and especially to find, if possible, the limit of strength in which such solutions could be used. Sodium chloride was tried also, side by side with the other salts. The wheat used was "White-chaffed Browick," twelve seeds per pot being sown on December 4, 1899, and each application was in duplicate. The respective salts were dissolved in 100 c.c. of distilled water, and the seed allowed to remain in the solution for twenty minutes. The plan was as follows:—

1. Seed untreated.
2. Seed soaked in a 1 per cent. solution of (*a*) sodium iodide, (*b*) sodium bromide, (*c*) sodium chloride.
3. Seed soaked in a 10 per cent. solution of (*a*) sodium iodide, (*b*) sodium bromide, (*c*) sodium chloride.
4. Seed soaked in a 20 per cent. solution of (*a*) sodium iodide, (*b*) sodium bromide, (*c*) sodium chloride.

The first notable appearance was with the seed soaked in a 10 per cent. solution of sodium iodide, there being a few strong plants, but the rest weakly. These took much longer to come up than the untreated seeds or than those soaked in a 1 per cent. solution of sodium iodide. Still more marked was the effect of soaking in a 20 per cent. solution of sodium iodide, the plants coming up still later, and looking very sickly. In the sodium bromide series the plants with 1 per cent. and 10 per cent. solutions came up and looked quite well, and even those with the 20 per cent. solution were not much inferior to the others. In the sodium chloride series the plants throughout, including the 20 per cent. treatment, were quite good, and, if anything, this series was the best of all.

The plants grew on, and by May 12 the only ones showing any difference from the rest were the 20 per cent. treatment of sodium iodide and sodium bromide, the latter, however, to only a small extent, while the iodide treatment (20 per cent.) showed a marked deleterious effect, the plants being still very weak. By July 14 the plants began to ripen; the only pots that looked inferior to the others were those to which the solutions of 20 per cent. strength had been used. The sodium iodide and sodium chloride were then the worst, and about equal to one another; the sodium bromide not so bad.

Though the results at the time of harvest did not bring out as strikingly as through the time of growth the detrimental effects of the use of the 20 per cent. solutions of the three salts, yet it will be seen from the following Table that these strengths gave in each case the lowest yields of corn, so that one can reasonably conclude that 20 per cent. solutions of these three salts are too strong to use for the soaking of seed wheat. As regards the 10 per cent. strength solutions, in the case of sodium iodide harm would seem to have been done; with sodium bromide the result was negative; while with sodium chloride benefit was apparently derived. Lastly, in all three cases a slight benefit resulted from the soaking in 1 per cent. solutions of the three salts. A similar result had been noticed with sodium iodide and sodium bromide in the experiments of 1899.

The crops were ready by August 10, and were then cut, the various measurements being taken previously. The principal results as regard length of straw, weight of corn, &c., were:—

—	Length of straw	Weight of corn	Weight of straw
	inches	grammes	grammes
Untreated	23·4	19·5	33·4
1 per cent. solution sodium iodide .	23·3	19·7	32·9
10 ,, ,, ,, ,, .	23·4	18·5	31·0
20 ,, ,, ,, ,, .	22·7	18·5	30·1
1 ,, ,, ,, bromide .	24·3	19·8	34·1
10 ,, ,, ,, ,, .	23·8	19·6	31·9
20 ,, ,, ,, ,, .	23·5	18·2	33·0
1 ,, ,, ,, chloride .	22·7	20·2	35·4
10 ,, ,, ,, ,, .	24·6	21·2	35·9
20 ,, ,, ,, ,, .	21·6	18·8	32·6

As general conclusions it may be said:—

1. That soaking of wheat seed, before sowing, in 1 per cent. solutions of sodium iodide, bromide, or chloride is productive of some benefit.

2. That a solution of 10 per cent. strength is too strong in the case of sodium iodide, but may be used with sodium bromide or chloride, though the benefit is uncertain.

3. That a solution of 20 per cent. strength is, in the case of all three salts, too powerful, and will do harm, this being most marked with sodium iodide.

4. *The Soaking of Seed Barley in solutions of Sodium Iodide, Sodium Bromide, and Sodium Chloride.*

The same experiment was tried with barley, and on the same kind of soil as the wheat. The barley, "Archer's Stiff-straw," was sown in zinc pots on April 25. Each trial was in duplicate, and twelve seeds were sown per pot, being reduced subsequently to six plants. The solutions used were exactly the same as for wheat. The barley came up well in all the pots, and there were practically no differences to record during growth and until the middle of July, when the series treated with sodium chloride did not look so well as the rest, more especially the heavier dressings. The crops were cut on August 21, and the following results were recorded:—

—	Length of straw	Weight of corn	Weight of straw
	inches	grammes	grammes
Untreated	13 82	7·04	7·94
1 per cent. solution sodium iodide	14 01	7 05	8·01
10 ,, ,, ,, ,, .	14·00	7·06	8·35
20 ,, ,, ,, ,, .	13·72	6·93	8·89
1 ,, ,, ,, bromide .	13·89	6·19 (?)	7·08 (?)
10 ,, ,, ,, ,, .	14·12	7·72	8·54
20 ,, ,, ,, ,, .	13 52	6·81	7·76
1 ,, ,, ,, chloride .	13·54	6·79	7·76
10 ,, ,, ,, ,, .	11·46	6·24	6·78
20 ,, ,, ,, ,, .	11·34	5·95	7·01

As regards the applications of sodium iodide there is nothing particular to note, except that the heavy application apparently did no harm, while the others practically gave no benefit except in the straw. The results with sodium bromide are not so clear, and, while those with the 1 per cent. solution are open to doubt, it is only the highest strength that has perhaps done some harm, and that not very marked. But the effects of sodium chloride application are very striking, length of straw, weight of corn, and weight of straw, all being adversely affected, and the more so as the solution is increased in strength.

The general conclusions are accordingly:—

1. That no benefit accrues to barley from soaking the seed in solutions of 1, 10 or 20 per cent. of either sodium iodide or sodium bromide.
2. That these salts, even in the stronger solutions named, have only a slight detrimental effect.
3. That soaking the seed in solutions of sodium chloride has a distinctly bad effect, the effect increasing with the strength of the solution.

MISCELLANEOUS POT-CULTURE EXPERIMENTS.

1. *Thick* v. *Thin Sowing of Barley.*

Experiments carried out in the two preceding years on the question whether it is better to sow barley thickly or thinly, had, for one reason or another, not turned out satisfactorily. The trial was, therefore, made again in 1900.

"Archer's Stiff-straw" was the variety grown, being sown in zinc pots on April 24, 1900. Each set was in duplicate, the arrangement being as follows:—

1. 2 pots each sown with 20 barley seeds, corresponding to 13 pecks per acre
2. 2 ,, ,, ,, ,, 15 ,, ,, ,, ,, 9 ,, ,, ,,
3. 2 ,, ,, ,, ,, 12 ,, ,, ,, ,, 7½ ,, ,, ,,
4. 2 ,, ,, ,, ,, 8 ,, ,, ,, ,, 5 ,, ,, ,,

The seeds were all weighed previously, and selected so as to be as nearly uniform in weight, &c., as possible. The plants came up very well, as the following Table shows:—

Pot	Number of seeds sown	Number of plants on May 5, 1900	Pot	Number of seeds sown	Number of plants on May 5, 1900
1	20	19	5	12	12
2	20	18	6	12	12
3	15	15	7	8	8
4	15	13	8	8	7

Up to the end of May there was nothing to distinguish the several lots, but by June 9 irregularities began to show, especially in the thicker seeding, some plants developing largely at the expense of others. This irregularity disappeared later on. There was no real difference as to the time of the several plants coming into ear. By July 21, perhaps the seeding with fifteen seeds per pot looked the best, and that with twenty seeds per pot was decidedly better than the thin sowing of eight seeds, the plants being stronger and the ear better filled. Photographed on July 28, the series presented the appearances shown in fig. 11.

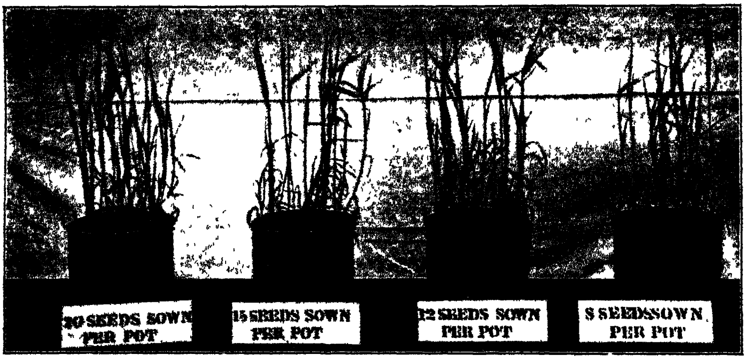
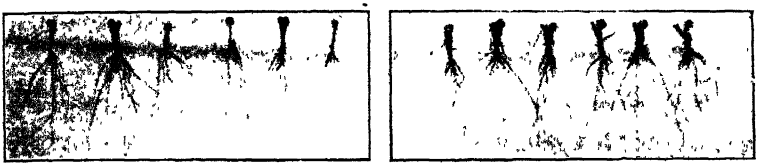


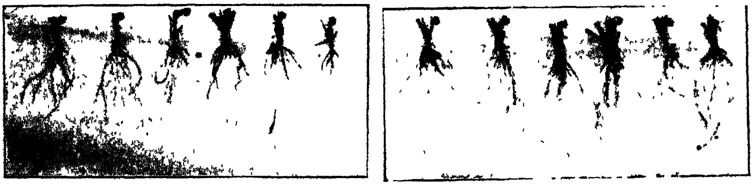
FIG. 11.—Thick and Thin Sowing of Barley. Appearances on July 28, 1900.

The crop was cut on August 22, and the following results were obtained:—

—	Length of straw	Length of ears	Number of ears	Number of grains	Weight of corn	Weight of straw
	inches	inches			grammes	grammes
1. 20 seeds per pot = 13 pecks per acre	11·11	1·72	18	238	9·45	12·04
2. 15 seeds per pot = 9 pecks per acre	11·69	1·81	17	229	9·14	11·79
3. 12 seeds per pot = 7½ pecks per acre	12·47	2·04	16·5	229	9·05	12·32
4. 8 seeds per pot = 5 pecks per acre	11·59	2·14	13	194	7·65	11·33



20 seeds per pot. 15 seeds per pot.



12 seeds per pot. 8 seeds per pot.

FIG. 12.—Thick and Thin sowing of Barley. Appearances of roots after harvest.

The roots of plants of the different sowings were taken up after harvest and photographed (fig. 12). It will be noticed that stronger root development took place according as the seed was sown thinner.

From these results it is apparent that a very thin seeding in the case of barley is not advisable. The heaviest yield of corn was given by the thickest seeding (twenty seeds). At the same time, this is not so much in excess of the next two (fifteen seeds, and twelve seeds) as to make up for the extra seeding, especially as the straw is also shorter with the heavier seeding. On the whole, the best result in corn and straw together was given by the seeding of twelve seeds per pot, equal to 7½ pecks per acre. In practice, however, allowing for loss by birds, insects, &c., this would be equivalent to about nine pecks per acre, and this experiment would point to the inadvisability of sowing a less amount in the field, whereas in the case of wheat it was shown that a seeding of as little as seven pecks per acre gave the best result. The general conclusions are:—

1. That a thicker seeding is advisable in the case of barley than with wheat.

2. That a seeding of not less than nine pecks per acre should in practice be employed for barley. A thicker seeding than this will give rather higher corn yield, but less straw.

2. *Hard and Soft Wheat.*

Experiments on this subject were begun in 1899, and were continued in 1900, the question of the influence of heavy and light soil respectively being introduced in addition to the questions (*a*) whether hard seed produces hard wheat, and soft seed soft wheat, (*b*) whether the one ear may bear both kinds of grain alike, and, if so, on what portions of the ear each is borne.

"White-chaffed Browick" wheat was used, twelve seeds being sown in each of twelve zinc pots on December 5, 1899. The seed was steeped, before sowing, in hot water (55° C.) for ten minutes. Two kinds of soil, the one a light sandy one, the other a fairly heavy loam, were used. A manurial application of rape dust at the rate of 10 cwt. per acre was given to each pot. The seeds sown were carefully selected, first as to general evenness of size, and then as to character, whether starchy or glutinous. The twelve seeds used in each pot were weighed and found to be very nearly alike. The arrangement of pots was:—

3 pots soft wheat in light soil.
3 „ hard „ „ „ „
3 „ soft „ „ heavy „
3 „ hard „ „ „ „

The plants came up very well, only seven seeds out of the total of 144 failing to produce plants. The plants were then reduced to six in each pot. Those in the heavier soil seemed to make the best progress. There was, by the end of July, little difference in the length of straw, but the plants in the heavy soil seemed stronger in the straw, and the ears better filled. The crops were cut on August 10, and the following results were obtained:—

—	Length of straw	Number of grains per pot	Weight of corn per pot	Weight of straw per pot
	inches		grammes	grammes
1. Soft seed in light soil	24·2	383	14·81	22·22
2. Hard „ „ „	23·9	376	13·81	21·64
3. Soft „ heavy „	21·7	344	13·55	20·21
4. Hard „ „ „	20·4	326	13·36	20 26

The gradation marked in these columns is a most regular one throughout, showing how the length, and, to some extent, the weight of straw, is reduced on the heavier soil, as also the number of ears, and, to a less extent, the weight of corn. Also, that the soft wheat, on the whole, produces a larger number of ears and greater weight of corn than the hard wheat.

Not only were the returns collected for each individual pot and the average taken, as above, but each separate plant was also taken by itself and the statistics tabulated, the grains yielded by the individual plants being examined and classified, as nearly as was possible, into starchy or glutinous grain. Some of the grains, of course, could not be thus absolutely distinguished, but the general result is very definite. Indeed, so interesting are the figures obtained that it is excusable to set them out at somewhat full length.

1. *Soft Seed in Light Soil.*—Of the 404 grains from the six plants of pot 1, all were, without exception, starchy. In pot 2, comprising 346 grains, only 24 grains—all from one plant—could be called glutinous. A large number were not classifiable. In pot 3, with 399 grains, 60 grains (on two plants) were glutinous, the rest starchy.

2. *Hard Seed in Light Soil.*—In pot 1, with 377 grains, five of the six plants had nothing but starchy grains, while one plant, much eaten by insects, and giving only 18 grains, had entirely glutinous grain. The destruction of the grain had, undoubtedly, prevented the starch formation in the later stages. In pot 2, with 340 grains, two plants had nothing but starchy grains, while the other four plants contained 70 glutinous seeds between them. Pot 3, with 411 grains, had one plant with 79 grains, of which 67 were distinctly glutinous, all the other plants having grains which were either distinctly starchy or such as could not be classed as glutinous.

3. *Soft Seed in Heavy Soil.*—There were 1,033 grains in the three pots altogether, and all the seeds were glutinous.

4. *Hard Seed in Heavy Soil.*—There were 978 grains in the three pots altogether, and all the seeds were glutinous.

Observations were further made as to whether the starchy grains—when both these and the glutinous ones appeared on the same stalk—occurred more in the upper portion of the ear or elsewhere, but there was no regularity as regards this. It was much more the case that one ear was found entirely composed of starchy grains, and the next entirely of glutinous grains, and whenever there was injury to the grain, or anything to prevent the full assimilation of starch, the grains were found to be entirely glutinous.

The relative percentages of the different kinds of grain in this experiment were :—

—	Percentage of starchy grains	Percentage of glutinous grains	Percentage not classifiable
1. Soft seed in light soil:			
Pot 1	100·0	—	—
„ 2	47·7	6·9	45·4
„ 3	84·9	15·1	—
2. Hard seed in light soil:			
Pot 1	95·2	4·8	—
„ 2	79·4	20·6	—
„ 3	64·7	16·3	19·0
3. Soft seed in heavy soil . .	—	100·0	—
4. Hard „ „ „ . .	—	100·0	—

As confirmatory of the great difference between the two kinds of grain, the following determinations made in the produce show how very much more nitrogenous the glutinous (hard) grains were :—

	Soft Wheat per cent.	Hard Wheat per cent.
Moisture	11·69	11·64
Nitrogen (on the dry basis) . .	1·80	2·68

CONCLUSIONS.

The bearing of these results is very clear, and fully confirms the general observations made in 1899, that a light sandy soil has the tendency to produce a starchy wheat grain, and a heavy soil a glutinous wheat grain, and that this is independent of the consideration whether starchy (or soft) or glutinous (or hard) seed has been sown. The soil, in other words, has the power of altering the character of the grain, and so it cannot be said that soft seed necessarily produces soft wheat, or that the sowing of hard seed ensures a crop of hard wheat.

II.—EXPERIMENTS IN WEED PREVENTION.

IN last year's Volume of the Journal (1900), pages 110 to 115, an account is given of the beginning of a series of inquiries having as their object the discovery of some means of preventing the spread of certain farm weeds which are troublesome to get rid of. These inquiries have now been carried a further stage, and the present is an account of what was done in the year 1900.

1. WILD POPPY. (*Papaver Rhœas.*)

The experiments of 1899 showed that poppy seed, owing to its hard enveloping case, was very slow in germinating; where the plants did appear they were found not to be affected by treatment with either gas liquor or common salt.

(*a*) *Experiments in Pots.*—The soil used was that of one of the farm fields where poppies thrive. In the pots the weed was grown without any corn crop, but in the cylinders with wheat. Seed was sown on March 15, 1900, but even with this earlier sowing it did not come up well in all cases. The treatment adopted was :—

1. Untreated.
2. Gas liquor.
3. Carbolic acid, 5 per cent. solution.
4. Sulphate of copper, 2 per cent. solution.

The applications were made on June 29, 1900, by spraying the solution on the plants with a fine jet from a wash bottle, playing on to a piece of wire gauze. Fifty cubic centimetres of each solution were so used. The gas liquor seemed at first to affect the plants and make them droop, but they soon recovered and, beyond looking a little brown, were none the worse. The carbolic acid solution killed everything, poppy and other weeds alike. The sulphate of copper, applied, as it was, on the top surface only of the leaves, had no visible effect.

(*b*) *Experiments in Cylinders.*—Here a corn crop (wheat) was grown with the weeds. The soil was the same as that used for the pots. The wheat was sown in November 1899, the poppy seed in March 1900. Poppy seed had previously been sown in 1899, but did not come up well, and what now appeared was more probably from the seeding of 1899 than from the new sowing of 1900. However, a good plant of poppy was the result, both wheat and poppy showing well in all three cylinders by May. The other principal weeds were *Polygonum* and *Capsella.* The poppy began to bloom at the beginning of June, and the several applications were made as follows:—

1. Untreated.
2. Gas liquor, on June 29, 200 c.c. (cubic centimetres) of a solution containing 3·3 per cent. of ammonia.
3. Sulphate of copper, on June 16, 200 c.c. of a 2 per cent. solution, the solution being applied, as far as possible, on the underside of the leaves.

By July 2, in No. 1 cylinder, the wheat came into ear and the poppy was in full bloom ; the application to No. 2 seemed to show some effect on the poppy, it having checked its growth, but nothing more, as the plant fully recovered afterwards ; in No. 3 cylinder the poppy had begun to turn brown quite early, and by July 2 the leaves were shrivelled up and the stems turned brown ; black spots appeared wherever the solution had touched either leaves or stem ; these spots showed on the wheat also, but did not seem to have hurt it at all.

By July 28 the poppy had died down in No. 1 ; in No. 2 the effects of the application had worn off, and probably an earlier application of the gas liquor should have been made; while in No. 3 (sulphate of copper on underside of leaves) the poppy heads were all dead and the seed capsule shrivelled up, the wheat, however, not being injured. Of the other weeds, *Capsella* was killed by both the gas liquor and the sulphate of copper, but not so the *Polygonum.*

From these trials several points come out clearly. Firstly, that, owing to the hard casing of the poppy seed, it is necessary to sow the seed early in order to ensure the plants appearing. Secondly, gas liquor would seem to be of no use as an application, though it would be well to try it applied at an earlier period than was the case here. Thirdly, while carbolic acid solution killed the poppy, it killed everything else green, and hence could not be used where a crop was growing. It remains to be seen whether, if put on bare land where wild poppy grows, carbolic acid would be removed from the soil by rain sufficiently to allow of a corn crop being sown subsequently. Fourthly, while spraying with sulphate of copper in the ordinary way, that is, on the top side of the leaves, did not permanently injure the poppy, yet, when applied carefully on the underside of the leaves (this part being covered with hairs), it certainly destroyed the poppy to a very great extent, while not doing any harm to the corn crop.

2. WILD OATS. (*Avena fatua.*)

In the experiments of 1899 neither gas liquor, sulphate of ammonia, nor nitrate of soda had any effect in reducing wild oats, either alone or in a corn crop. The trial was repeated in 1900 with modifications.

(*a*) *Experiments in Pots.*—The soil used was from an adjoining farm, wild oats thriving on it. The oats were grown without a corn crop, the seed being sown on March 25. The agents employed for dressing the wild oats were sulphate of ammonia, nitrate of soda, sulphate of potash, and gas liquor, but not one of them produced any definite effect.

(*b*) *Experiments in Cylinders.*—The same soil was used, but a corn crop (barley) was grown with the wild oats. Cylinder No. 1 was left untreated, No. 2 had sulphate of ammonia, and No. 3 nitrate of soda. In the two latter the wild oats outstripped the barley, and it is clear that this weed cannot be got rid of by dressings of soluble nitrogenous salts which might push on the barley crop ahead of the weeds. The wild oats, indeed, seem to get the benefit of the dressing before the barley does.

3. WILD ONION. (*Allium vineale.*)[1]

In the experiments of 1899 this weed did not appear during the progress of the actual experiment, but came up after it was concluded, when, on being then (in December 1899) sprayed with a ten per cent.

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[1] An illustration of Wild Onion (or Crow Garlic) appears at page 738 of the Volume for 1900.

solution of pure carbolic acid, the plants were all killed. The question was, Would the soil become sufficiently freed from the acid by the washing with rain to allow a corn crop to be grown later?

(*a*) *Experiments in Pots.*—Early in March the onions were growing well in all the pots except those to which carbolic acid had been put, and the crop was utilised for the 1900 experiments. As carbolic acid—used pure—had killed the weed, it was thought well to try the common form of the acid, or "crude" carbolic acid. This contains some quantity of tar, and it was found on applying it (March 5) that the tar prevented the acid from coming fairly on to the plant. Where the acid actually came in contact with the plant the latter was killed, but the tar acted largely as a preventive of this. Next, to avoid this difficulty, an emulsion of the "crude" acid with caustic soda was made. This certainly answered better than the "crude" acid alone, and the onion was to a good extent destroyed, though still not so completely as with the pure carbolic acid. Barley was sown on May 3 in some of the pots, including those where the wild onion had been apparently all killed by the pure carbolic acid. In these latter the barley grew at once, and continued well throughout, showing that the carbolic acid had been washed out of the soil; the wild onion, moreover, did not appear again. But where "crude" acid and the emulsion of acid with caustic soda had been used, though the barley came and grew all right, the wild onion grew also again.

Two other pots, the onions and barley growing together in them, were sprayed with a 2 per cent. solution of sulphate of copper on June 16. This produced some black spots on the stems, but apparently had no ill effect. Lastly, in two other pots containing the wild onion, the stems of the onion were cut short, and the cut ends touched with, in one case, carbolic acid, and in the other, sulphuric acid (oil of vitriol), to see whether these agents, going down to the bulbs, might destroy their future vitality. The effect was, in each case, to brown the stems, but the bulbs were not permanently injured, for they threw off fresh bulbs unaffected by the acids, and so laid up a store ready for another season. Fig. 1 on page 338 illustrates some of the different appearances shown.

A further experiment was made with regard to the soil on which the onion thrives. The soil, as used above, was mixed with an equal amount of sand, and onion bulbs were planted in it. It was found that the onion grew equally well in the original heavy soil and in this lightened soil.

(*b*) *Experiments in Cylinders.*—The onion plants sown early in 1899, and which appeared in December 1899, were left to grow in the three cylinders. To one of them 100 c.c. of a ten per cent. solution of pure carbolic acid was put on February 2, and the onions were, as a consequence, killed off altogether. Barley was sown in May, and it grew perfectly well. In a second cylinder the stems of the onion plants were cut short before the seed was formed in the flowering head, and the effect was left for future observation. The third cylinder was left untreated.

(*c*) *Experiments in the Field.*—As the experiments of 1899 seemed to indicate that the wild onion plant was seriously injured by treatment with carbolic acid solution, it was decided to make in 1900 practical trial of this in the field, and to ascertain (1) whether merely the stems and shoots were affected, or the vitality of the bulb itself injured, and (2) whether the soil was injured so that it would not produce a corn crop afterwards. Accordingly, a field in the neighbourhood was selected on which wild onion is a great pest, and a part was marked out and hurdled off for experimentation. Wild onion is found in patches, as a rule, and not distributed all over a field, and this was the case here. A plot 12 ft. by 12 ft. was selected where the onion was most prevalent. The soil was a decidedly stiff clay, and the field was at the time in "seeds," which had been sown with the previous barley crop.

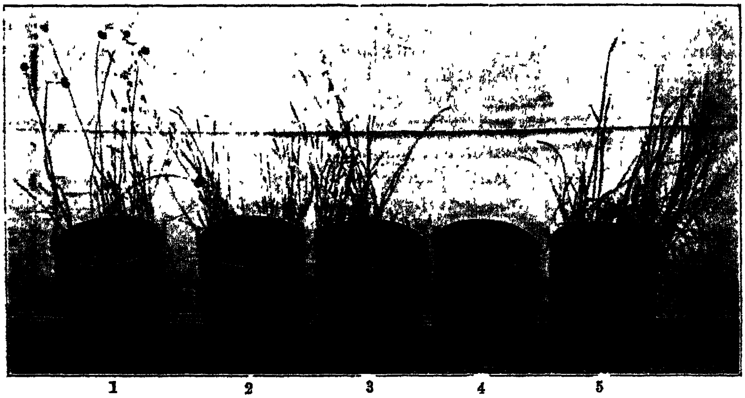

FIG. 1.—Wild Onion. 1. Treated with sulphate of copper. 2. (With barley) onion stems cut short to prevent re-seeding. 3. (With barley) onion stems cut short, and touched with sulphuric acid. 4. Treated with pure carbolic acid, showing wild onion destroyed. 5. Same as 4, but with barley sown subsequently, the barley thriving through removal of the carbolic acid by rain.

On March 31, 1900, the plot was watered, from an ordinary garden water-pot, with one gallon of a solution made up by mixing one gallon of crude carbolic acid with nine gallons of water. Owing, however, to the tarry matter contained in the crude acid, it was found very hard to get a proper mixture, the tar etc. floating on the top, so that when the watering was done, the carbolic acid etc. practically came only on the first portions of the plot, and the remainder had little more than the residual water. This was very clearly indicated by the subsequent appearance of the plot, for, while the onion on the edges of the plot (the part first watered) turned brown and shrivelled up, the centre part remained green and almost unaffected. Subsequently, later in the year, this difficulty was got over by the employment of what is commercially known as 'brown carbolic acid.' The strength of this is, I am told, about equal to that of Calvert's No. 5, and it contains very little of the tarry matter.

As the onion only appeared killed where the first application of acid fell, but remained green and strong elsewhere, it was thought advisable to try whether by cutting the stems off before the flowering head ripened into seed the spread of the weed could be checked. If so, the passing of a scythe or mowing machine over the surface before the seed-head ripened would be a means of eradicating the pest even in a pasture. This was accordingly done on June 15 on a portion (6 ft. by 12 ft.) of the plot, and the result left for observation. No fewer than 226 heads were in this way removed off this small area.

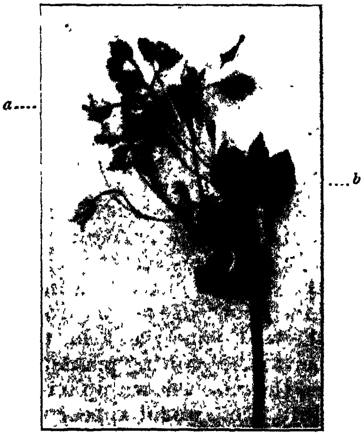

FIG. 2.—Wild Onion. Flowering head, showing (*a*) flowers, (*b*) bulbils.

During the investigation some interesting observations were made from watching the behaviour of the wild onion plant. The usual method of propagation of the onion plant is two-fold—viz., either by seed produced in the ordinary way from the flowering head, or by "bulbils," which are small fleshy bodies forming also on the flowering head (see fig. 2). Now if this were the case with the wild onion it ought to be easy to destroy the weed by cutting the flowering stem before the seed and bulbils form. But it was clearly shown in these experiments that there is yet another and important way in which the weed is propagated, —viz., by the splitting off of fresh bulbs from the parent one. At the beginning of the year the parent bulb lies deep below the surface of the soil, quite 6 to 8 inches down, and is firmly imbedded there. When the stem is thrown up it is almost impossible to pull the stem and bulb up together. But, as the season advances, the bulb seems to work up to the surface, and about June it is quite easy to pull up stem and bulb together. Examination of the bulb then shows that there is not merely the parent bulb, but that numerous side

FIG. 3.—Wild Onion. Parent bulb with "off-sets."

bulbs or "off-sets" are present also; these, somewhat triangular in shape (see fig. 3), are ranged round the parent bulb, and, as the latter dies, the new bulbs are thrown off and become fresh plants, each capable of sending up a new stem and in turn producing not merely seed and bulbils, but fresh bulbs themselves. It would indeed appear, from observations made by Mr. Freear, my assistant at the Pot-culture Station, that this method of propagation is, in the case of the wild onion, the most common one, and the question of eradication is, in consequence, further complicated. About July, so Mr. Freear has observed, the new bulbs thus thrown off actually gather on the surface of the soil, and it struck him that if at this stage they could be treated with something that would destroy their vitality, without hurting the soil, the eradication might be effected. Accordingly, when the bulbs were thus collected on the surface, carbolic acid solution was applied on August 8, and the result was left for further observation.

From these interesting investigations it will be seen that some definite knowledge has been obtained regarding the nature of growth of the wild onion; and, in the application of carbolic acid solution either to the growing plants, or, perhaps preferably, to the bulbs when they are thrown up on the surface of the land about the end of July, there would appear to be good reason for hope as to successful means of eradication.

4. ANNUAL CHRYSANTHEMUM. (*Chrysanthemum segetum.*)

The experiments of 1899 seemed to show that a marked diminution, indeed, almost a total disappearance, of this weed in a corn (barley) crop could be effected by an application of lime shortly before the weed generally made its appearance (about June). It was in this direction, therefore, that experiments were continued in 1900.

(*a*) *Experiments in Pots.*—The seed was sown—fifty seeds in each of eleven zinc pots—on March 15, 1900, but, as illustrating the vagaries of weeds, the plants in no case appeared this year, even where only the natural soil was used and without any treatment

(*b*) *Experiments in Cylinders.*—The seed was sown in these on March 21, 1900, and barley seed was sown also on May 16. No. 1 cylinder had no treatment applied. No. 2 was the same that had lime (at the rate of two tons per acre) applied the previous year, while to No. 3 lime at the same rate was applied shortly before the chrysanthemum seed was put in. In these cylinders the weed duly appeared, though, singularly enough, they would not come in the small zinc pots.

In No. 1 cylinder (untreated) the barley, though it came up, was almost entirely choked by weeds, not only chrysanthemum but sorrel and spurry also being very thick. In No. 2 (lime in 1899) there was a fair amount of chrysanthemum, but sorrel and spurry were almost entirely absent. It must be remembered that though lime was applied in 1899, fresh chrysanthemum seed was again sown in 1900. In No. 3 (lime in 1900), however, the chrysanthemum was very largely reduced, and what plants occurred were small and stunted. No sorrel or spurry was present either.

These observations would point to lime being effective when applied freshly, shortly before the time the weed appears, but that a previous year's application is not effective, at least when fresh seed is allowed to come on the land.

(*c*) *Experiments in the Field.*—A portion of a field on a farm in the neighbourhood, and on which annual chrysanthemum is a great pest (so much so indeed as to almost destroy an oat or barley crop, and to give the field in summer the appearance of a cloth of gold), was placed at disposal for the purpose of experimenting on a practical scale. Lime, at the rate of 2 tons per acre, was applied to one part, on which oats were subsequently grown. It was found that liming, with cultivation of the land, greatly reduced the growth of the weed, but that liming by itself was not effectual.

The general outcome of the experiments of 1900 on the weeds named is to show (1) that, as regards wild poppy, the use of sulphate of copper applied on the underside of the leaves bids fair to be successful in eradicating this weed; (2) that wild onion on arable land may be destroyed, or at least largely reduced, by treatment with carbolic acid solution, the soil being in no way injured for a subsequent corn crop; (3) that the application of lime in spring will, with proper cultivation, largely reduce the growth of annual chrysanthemum. So far, nothing has been found to affect the growth of wild oats while not equally injuring a barley crop. The experiments are being continued.

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13 Hanover Square, W.

REPORT TO THE NATIONAL AGRICULTURAL EXAMINATION BOARD ON THE RESULTS OF THE SECOND EXAMINATION FOR THE NATIONAL DIPLOMA IN AGRICULTURE,

HELD AT LEEDS, MAY 6 TO 8, 1901.

1. THE Sub-Committee to whom was delegated by the National Agricultural Examination Board the conduct of the second examination held by the Board for the NATIONAL DIPLOMA in the Science and Practice of Agriculture, beg leave to report that by the courtesy of the authorities of the Yorkshire College, this examination was held at Leeds from May 6th to 8th, 1901, when 46 candidates were examined, 40 in Part I. and 6 in Part II.

2. It will be in the recollection of the Board that from the first it has been considered desirable that, in order to secure thoroughness in the study by the candidates of the several subjects included in the Syllabus for the Diploma, the examination should be spread over two years, and be taken in two Parts or Divisions : Part I. (first year), comprising the subjects of Mensuration and Land Surveying, Agricultural Botany, General Chemistry, Geology, and Agricultural Entomology ; and Part II. (second year), the subjects of Practical Agriculture, Agricultural Book-keeping, Agricultural Chemistry, Agricultural Engineering, and Veterinary Science.

3. At the first examination for the Diploma, held at Leeds in May, 1900, permission had been given to candidates, as an exceptional privilege, for both parts of the Examination to be taken in the same year, with the object of meeting the convenience of candidates who might have been studying for either of the separate examinations of the two Societies now replaced by the new joint examination. The results of 1900 showed, however, that advantage had been taken of this special privilege, not only by candidates who had been properly prepared for the Diploma, but also by a number of other competitors who had not devoted sufficient attention to all the ten subjects of examination to justify their attempting both Parts, or even Part I.

The Board decided, therefore, at their annual meeting on October 11, 1900, that for the future a candidate should not be entitled to take both Parts of the examination at one time.

4. This decision appears to have been amply justified by the results of the second examination, held in May, 1901 ; for of fifteen candidates who failed in 1900, and presented themselves again for examination this year, ten were successful, after a further year's prepa-

ration, in passing Part I., and the remaining five showed considerable improvement.

5. There were seven candidates who, having passed in Part I. of the Examination in 1900, were entitled under the Regulations to come up for examination in Part II. this year. Six of the seven availed themselves of this privilege, and five of them succeeded in passing in all the five subjects included in Part II. As none of these candidates succeeded in obtaining three-fourths (1,425) of the aggregate maximum marks (1,900) in the entire examination, there will be no Diploma with Honours or Gold Medal to be awarded this year; but the following students (in order of merit) will be entitled to receive the National Diploma in Agriculture as having passed in all the ten subjects of the examination:

1. Albert William Oldershaw, Midland Agricultural and Dairy Institute, Kingston, Derby.
2. John Montgomerie Hattrick, West of Scotland Agricultural College, Glasgow.
3. Bernard William Bull, Ramsden, Billericay, Essex.
4. Simon Blobe, University College of Wales, Aberystwyth.
5. Thomas Young, West of Scotland Agricultural College, Glasgow.

6. The total number of candidates who entered this year in Part I. was 42; of whom 2 were absent, 20 failed and 20 passed. The names of the successful candidates in Part I. are (in alphabetical order) as under:—

[6]Samuel Alker, Melling's Farm Tan Pits, Pemberton, Wigan.
[7]James Bradshaw, The University, Glasgow.
[8]Thomas Brown, Greenhill House, Salterforth, Colne.
[9]William Maitland Findlay, Agricultural Dept., The University, Aberdeen.
[10]Frederic Fletcher, B.A. B Sc.. St. John's College, Cambridge.
[11]John Forrest, Harris Institute, Preston.
[12]Patrick Fowlie, The Agricultural College, Aspatria.
[13]Percy Worthington Goodwin, The Agricultural College, Aspatria.
[14]Alexander Graham, Finneston, Bawhirley Road, Greenock.
[15]Joseph Johnson Green, Durham College of Science, Newcastle-on-Tyne.
[16]Geoffrey Steele Henderson, St. Margaret's, Kilmarnock.
[17]Abel Edwin Jones, University College of Wales, Aberystwyth.
[18]Daniel Ambrose Lees, University College of Wales, Aberystwyth.
[19]Thomas Milburn, Haverthwaite, Ulverston.
[20]John Percival, Harris Institute, Preston.
[21]Edward Porter, Chesham Lodge, Great Eccleston, Garstang.
[22]Ernest Pyatt, University College of Wales, Aberystwyth.
[23]John Edwin Rigg, Harris Institute, Preston.
[24]Leonard Scott, Agricultural School, Holmes Chapel.
[25]William Benson Thompson, The Mountbarrow Farm, Ulverston, Lancs.

	Students at
No. 1.	Midland Agricultural and Dairy Institute, Kingston, Derby.
Nos. 2, 5, 7, 14, 16, 21. .	West of Scotland Agricultural College, Glasgow.
„ 3, 24. . . .	Agricultural School, Holmes Chapel.
„ 4. 17, 18, 22. . .	University College of Wales, Aberystwyth.
„ 6, 11, 19, 20, 23, 25. .	Harris Institute, Preston.
„ 8, 25.	Yorkshire College. Leeds.
No. 9.	Agricultural Department, University, Aberdeen.
„ 10.	St. John's College, Cambridge.
Nos. 12, 13. . . .	Agricultural College, Aspatria.
No. 15.	Durham College of Science, Newcastle-on-Tyne.

7. The reports of the Examiners in the five subjects included in Part I. are as follows :—

1. MENSURATION AND LAND SURVEYING. (Maximum, 200 Marks.)
Mr. H. Trustram Eve, F.S.I.

The questions were not as a whole well answered, the quality of the answers not showing much knowledge of the subjects. There was very little improvement in the actual methods used in Mensuration questions, manifest short cuts being largely ignored. The Plotting was well done, and great improvement was shown in the knowledge of Levelling. The candidates appeared to know very little about Ordnance Maps. Many of the papers evidently did not do justice to the candidates' attainments, owing to want of judgment as to the time which should have been occupied on certain of the questions, and owing also to the fact that in many cases the paper was not carefully studied as a whole in the first instance.

2. AGRICULTURAL BOTANY. (200 Marks.) Mr. W. Carruthers, F.R.S.

The candidates showed a decided improvement in the accuracy and extent of their knowledge, especially in those subjects which had a bearing on the practical work of the farm. An exception must be made as to the questions dealing with the characters of groups of plants, which were as a whole indifferently answered. As the classification of plants is of much practical importance in forming a judgment as to the probable properties of the less known plants of the farm, more attention should be given by candidates to this department of the subject.

3. GENERAL CHEMISTRY. (100 Marks.) Dr. T. W. Drinkwater.

The paper was better answered than that of last year. I found very little evidence of "cram," either in the written answers or in the oral portion of the examination, but the average marks of the successful candidates were not high. The answer to Question 8 involved the use of figures, and I was struck by the roundabout method of calculation adopted by the majority of the candidates. It was practically a simple multiplication sum, but in most cases the working covered a sheet and a half of paper. Question 4, which was a purely practical question, was attempted by nearly all the candidates, and was fairly well answered.

4. GEOLOGY. (100 Marks.) Mr. J. E. Marr, M.A., F.R.S.

The answers to the papers were satisfactory, and proved that the candidates had obtained a good grasp of the subject, save in one particular: a question on Geological Maps was rarely attempted, and was in no case correctly done. Each candidate was questioned orally concerning the construction of geological maps and sections, but the replies were not good. It is very important that agricultural students should be acquainted with the elementary principles of geological mapping and section drawing.

5. AGRICULTURAL ENTOMOLOGY. (100 Marks.) Prof. J. Arthur Thomson.

The addition this year to the Syllabus of a clause indicating the necessity of practical acquaintance with common insects, worm-parasites, &c., seems to have had a salutary effect, for the work of the candidates this year was on a distinctly sounder basis. Most of the specimens were identified with readiness, and the great majority of the candidates gave evidence of careful and thorough preparation.

8. The Examiners in the five subjects included in Part II. report as below :

6. PRACTICAL AGRICULTURE. (Maximum, 500 Marks.) Mr. T. A. Dickson, Mr. James Biggar, and Professor McCracken.

The knowledge shown by the candidates as a whole was good, without any high standard of merit being attained. They were conversant with the agricultural practice of their own districts, but their acquaintance with the methods pursued in other localities was in many cases imperfect. They were well informed as to the economical feeding of farm animals and the manuring of crops. The knowledge of arable farming, speaking generally, was more thorough than that of dairy farming. Candidates might with advantage give more attention to the subject of farm buildings. There was, perhaps, a want of a comprehensive grasp of the various subjects, the tendency being to give diffuse answers made up of somewhat badly arranged details: better marks would be earned if candidates spent more time upon the consideration of the question, restricting themselves in their answers to the point actually raised.

7. AGRICULTURAL BOOK-KEEPING. (200 Marks.) Mr. W. Home Cook, C.A.

The papers were on the whole well done, and showed that the candidates had a fair knowledge of book-keeping. The style in which some of the papers were worked out was very creditable.

8. AGRICULTURAL CHEMISTRY. (200 Marks.) Dr. J. Augustus Voelcker, M.A., F.I.C., and Dr. Bernard Dyer, D.Sc.

No particular excellence was shown by any of the candidates; but the answers given, alike in the written and oral examinations, were, on the whole, correct so far as they went. The shortcomings were mainly in the direction of lack of definiteness, this being evidently due, in some cases at least, to over-cautiousness on the part of the candidates as to committing themselves to details, rather than to lack of knowledge.

9. AGRICULTURAL ENGINEERING. (200 Marks.) Mr. R. M. Greaves.

Comparing this year's examination with that of 1900, there is a considerable improvement in the manner in which the questions have been answered. Although there is a fair acquaintance with general principles, there is a want of knowledge as to how these principles are applied in everyday practice and in ordinary agricultural machinery. There appears also to be a want of skill in drawing, and it is important that more attention be paid to this, since some power of using the pencil is almost a necessity in all engineering work.

10. Veterinary Science. (100 Marks.) Professor J. McFadyean.

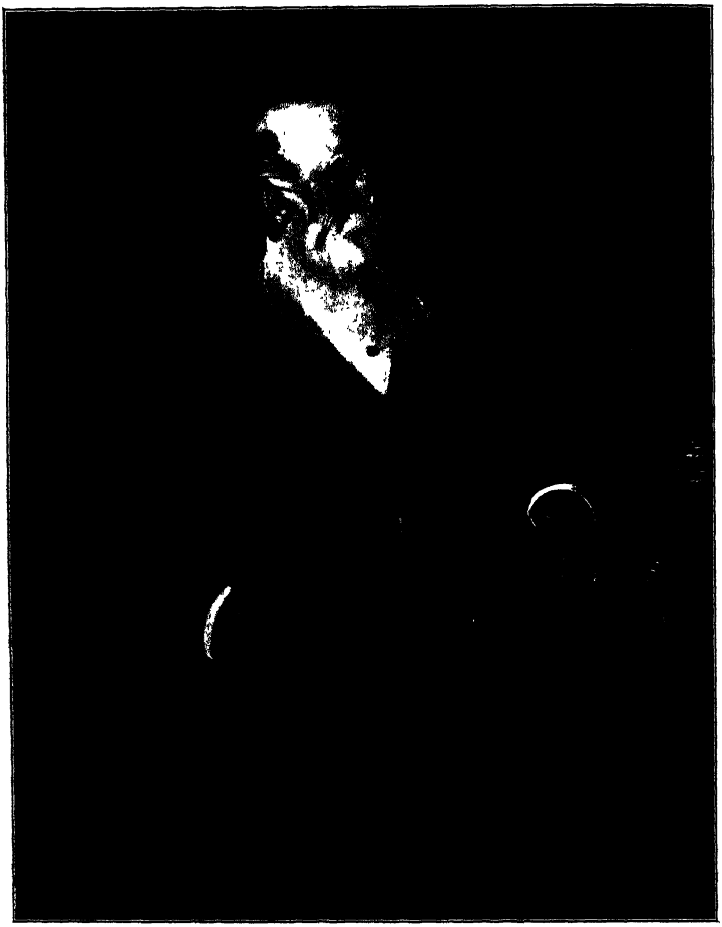
Several of the written papers were weak, and with one exception the candidates acquitted themselves much better in the *vivâ voce* part of the examination. Upon the whole, the candidates displayed a reasonable knowledge of the subjects specified in the syllabus under the head of Veterinary Science.

9. The thanks of the Board are due to the authorities of the Yorkshire College, Leeds, for their liberality and courtesy in placing the Large Hall and other rooms of the College at the Board's disposal for the examination; and to the several Examiners for the care and attention they bestowed upon the written answers to the papers set, and upon the *vivâ voce* examination.

Moreton (*Chairman*).	John Gillespie.
Ernest Clarke.	James Macdonald.

June, 1901.

[*For Examination Papers, see Appendix, p.* clxxxiv.]



Yours sincerely

J. Henry Gilbert

Notes, Communications, and Reviews.

In Memoriam.

SIR JOSEPH HENRY GILBERT

PH.D., M.A., LL.D., SC.D., F.R.S.

BORN AUGUST 1, 1817; DIED DECEMBER 23, 1901.

BY the death of Sir Henry Gilbert, on December 23, 1901, Agricultural Science has lost its most distinguished and venerable figure, and the Royal Agricultural Society the last of that earnest band of scientific pioneers whose researches opened the eyes of farmers in the Society's earliest days to new possibilities in the methods of cultivating the soil.

Joseph Henry Gilbert was born at Hull on August 1, 1817. His father was a Congregational Minister of considerable reputation and ability, and his mother was Ann Taylor, one of two sisters who wrote together a collection of hymns and songs for children. There were four sons and three daughters of this union. The eldest son Josiah (an artist), died in 1893, and the eldest daughter, Miss Jane Gilbert, alone survives.

On the completion of his school education, Joseph Henry Gilbert went through a course of studies at the University of Glasgow, where, as subsequently, he devoted special attention to Chemistry, working in the laboratory of Professor Thomas Thomson. A gunshot accident, which caused the loss of one eye, impaired his health for some time in his student days. He next went to University College, London, attending the classes of Professor Graham and others, and working in the laboratory of Dr. Anthony Todd Thomson, then Professor of Materia Medica, Therapeutics, and Toxicology. He had for his fellow-student, John Bennet Lawes, with whom he was ultimately destined to be permanently associated. Afterwards he spent a short time in the laboratory of Liebig at the University of Giessen, where he took the degree of Doctor of Philosophy.

At that time Liebig's fame was attracting a large number of English students, and amongst those whom Gilbert met at Giessen were Lyon Playfair, afterwards Lord Playfair (died 1898), and Dr. Augustus Voelcker (died 1884), each of whom subsequently became

Consulting Chemist to the Royal Agricultural Society. On the death of the latter, Gilbert wrote for this Journal (Vol. for 1885, pp. 308 *et seq.*) an appreciative memoir of his old colleague and "most intimate scientific friend;" and it is on the ground of the close and familiar friendship that has for so many years existed between our families that I have claimed the melancholy privilege of paying a tribute in these pages to the memory of one who was not only my agricultural mentor but my lifelong friend and teacher.

After his return from Giessen to this country, Gilbert acted as class and laboratory assistant to Dr. A. T. Thomson at University College, London, in the winter and summer seasons of 1840–41, attending other courses at the College at the same time. He next devoted some time to the chemistry of calico-printing, dyeing, and the like, in the neighbourhood of Manchester.

In June 1843 he took the decisive step of his life by becoming associated as coadjutor and technical adviser with John Bennet Lawes, who had earlier in that year started on a regular basis an Agricultural Experiment Station at his ancestral home of Rothamsted. Gilbert was then 26 years of age, and thenceforward until the end of his long career he remained associated with Rothamsted and its owner. He lived in a house at Harpenden near the Laboratory, and in 1850 married his first wife, Miss Laurie, who died in 1852. In 1855 he married Miss Maria Smith, the present Lady Gilbert, who proved a true help-meet to him, and by her personal devotion and active co-operation in his work exercised over his life a most important influence. He had no family by either marriage.

From June 1843 to August 31, 1900, when Sir John Lawes died, there continued an unbroken friendship and collaboration, the results of which are so well known to all interested in agriculture, and the length of which is (and is likely to remain) unparalleled in scientific annals. The pages of this Journal (Vol. for 1900, pp. 511–524) already contain a review of the main features of the work these two distinguished scientists carried out together, a statement of the principal subjects with which their investigations were concerned, and mention of the chief of the many important papers in which they embodied the results of their researches. In several different forms also—by publications in this country, in America, and elsewhere—the Rothamsted experiments have become such an integral part of agricultural literature that it would be superfluous to go over the ground again here, and attempt to deal in any adequate manner with the work of Sir Henry Gilbert. What was Lawes' work was Gilbert's work; the two are indissolubly connected, and, as we retain the memory of the two together, so we shall retain their works. Together, Lawes and Gilbert will go down to posterity as the name of a combination unique in its character and unique in the influence which it had upon the agriculture of the nineteenth century and on agricultural science in particular.

A life so prolific in its labours and results could not fail to meet with many marks of recognition from learned societies, universities, and public bodies, and Gilbert, who joined the Chemical Society as a Fellow in 1841, became its President in 1882-3. In 1898, when the Society gave a banquet to past presidents who had been members of the Society for fifty years or more, Gilbert was the senior of the five past presidents thus entertained. To the Journal of the Chemical Society he contributed from time to time papers on chemical points brought out in the course of the Rothamsted investigations. Gilbert was elected a Fellow of the Royal Society in 1860, and in 1867 he, in conjunction with Lawes, received a Royal medal from that Society, in recognition of their joint labours. At the Meetings of the British Association he was a frequent attendant, and gave lectures or read papers there on several occasions. At the Swansea Meeting of 1880, he was President of the Chemical Section of the Association. It was to the Journal of the Royal Agricultural Society more than elsewhere that the papers of Lawes and Gilbert were contributed, and many are the valuable records included in its volumes. Gilbert was elected an Honorary Member of this Society in 1883. In 1884 he was appointed Sibthorpian Professor of Rural Economy at Oxford University, occupying the chair for six years, and in this capacity gave, in the form of lectures, a summary of the Rothamsted investigations.

The Linnean, the Royal Meteorological, and other Societies claimed him as a member; and in 1894 the Society of Arts awarded him, jointly with Lawes, the Albert Gold Medal, the presentation of which was made by the Prince of Wales at Marlborough House. The Royal Agricultural College, Cirencester, elected him an Honorary Professor, and he from time to time gave lectures to the students there. Numerous Universities accorded him honorary degrees, and he became, in succession, LL.D. of Glasgow (1883), M.A. of Oxford (1884), LL.D. of Edinburgh (1890), and Sc.D. of Cambridge (1894). He was also honorary and corresponding member of several foreign agricultural and scientific societies.

Besides being appointed on various Commissions in this country, he not infrequently attended Agricultural Conferences held on the Continent, and in these he took an active part, presiding, indeed, on the occasion when Hellriegel first communicated the results of his famous investigations on the assimilation of nitrogen by leguminous plants. His travels extended still farther, and visits to Canada and the United States in 1882, and again in 1884, were followed up by the delivery by him, in 1893, in the United States, of six lectures in accordance with the provisions of the Lawes Agricultural Trust. The presence of Gilbert in America was welcomed by all scientific men there with much enthusiasm, and the esteem in which his name is held in that country is in no way inferior to that accorded to him here. On the memorable occasion of the celebration of the conclusion of the fifty years of the joint labours of Lawes and Gilbert, the latter was presented, on July 29, 1893, at Rothamsted, with a silver salver suitably inscribed, together with addresses from many distinguished bodies, and his name, with that of Lawes, was cut upon the massive granite monolith which now stands in front of the Rothamsted Laboratory as a memorial of their long association and work. Soon after this, on August 11, 1893, Gilbert received the well merited honour of Knighthood at the hands of Her late Majesty Queen Victoria.

The partnership and collaboration of "Lawes and Gilbert" represented an excellent embodiment of the Society's motto, "Practice with Science." Lawes was essentially the practical agriculturist—quick to see and grasp what the farmer wanted, and to become the interpreter to him. He was the man to whom the practical farmer turned, the one to write a brisk article on some subject of agricultural practice or economy, to answer a practical question, or to solve some knotty problem. Lawes was the more versatile of the two, the more inclined to introduce changes in and modifications of the original plan; and he has been known to say, jokingly, that if he had been left to have his own way, he would have ploughed up many of his experimental plots before they had yielded the full results which continuance on the old lines alone brought out.

Gilbert, on the other hand, was possessed of indomitable perseverance, combined with extreme patience and careful watching of results. His was the power of forecasting, as it were, what might, in the end, lead to useful results. With the determination to carry out an experiment to the very close he united scrupulous accuracy and attention to detail. Gilbert, it may be said, was not so much the man for the farmer, but for the scientist, and he it was who gave scientific expression to the work at Rothamsted, and who established Field Experiments on a scientific basis in this country.

To which of the two the greater originality of purpose belonged may be open to some question. To many, it might seem that the leading mind was that of Lawes, ever eager to attack some new problem, or adapt some experiment to a fresh end, while Gilbert represented more the man of detail and of persevering application in the prosecution of a plan when once definitely decided upon. But to others who have known Gilbert well it must be clear that he was very much more than this, and that much of the work on questions of the day emanated from suggestions of his. Evidence of this is to be found in the work he originated in connection with soil inoculation and the assimilation of nitrogen by leguminous plants—a subject with which Lawes interested himself less, feeling, as he expressed it, that his lifetime would not suffice to solve the questions of soil fertility, apart altogether from the problems connected with the growth of clover and other leguminous crops.

Each of the partners, then, had his own sphere, and the influence of the two minds, in themselves essentially different, the one on the other, materially contributed to the success which attended their joint efforts, and made the Rothamsted experiments a standard for reference, and an example wherever agricultural research is attempted.

To this happy combination is largely due the present value of the Rothamsted experiments. As the work has proceeded, there has been felt the need of calling in the aid of science in other branches, such as Botany and Physiology, to assist in the work of inquiry. That the value of such co-operation was appreciated by Lawes himself is seen in the words which he made use of in 1855, on the occasion of the presentation to him of a new laboratory, erected by public subscription, when he said: "To Dr. Gilbert more especially I consider a debt of gratitude is due from myself and from every agriculturist in Great Britain. It is not every gentleman of his attainments who would subject himself to the caprice of an individual, or risk his reputation by following the pursuit of a science which has hardly a recognised existence. For twelve years our acquaintance has existed, and I hope twelve more years will find it continuing."

To Gilbert indeed it may be said is really due the continuity of the Rothamsted experiments. It was he who foresaw what value might lie in the continuance of these successive experiments from year to year, with the same applications of manures and the same treatment, until all possibility of error and all variations due to season were eliminated by repetition of the experiment. Not till such repetition was carried out were the conclusions allowed to be set forth. The result is that we are now in possession of a series of records the stability of which is guaranteed by their repeated verification, and the value of which consists largely in their continuation over a long series of years. For this the Rothamsted experiments are indebted mainly to Gilbert, though it says much for the kindly feeling that pervaded the relations of the two men that the one was so ready to listen to and be influenced by the arguments of the other; while we, as successors now to the heritage left by them, have to be thankful alike for the persistency with which the plea for continuity was maintained, and for the spirit in which it was met.

But, after all, this was but the exemplification of the harmonious way in which the relations of these two great men were preserved. It was pre-eminently noticeable of this long association that in their work there was no one of them first and no one second, nor was there even the "predominant partner." It was essentially a partnership devoid of any jealousy whatever, and actuated by a feeling of mutual regard and esteem. This comes out very clearly in the fact that of the 132 contributions that have been issued from Rothamsted it is only one here and there that bears the single name of either author, for, with a few exceptions, all appeared under the joint names of Lawes and Gilbert, and so the public have come to recognise them. Day after day, whenever Lawes was at Rothamsted, Gilbert went up to the Manor House, and for an hour or more the two were together in Lawes' study holding conference as to the work that each had so closely at heart. In the case of this association, at least, the "caprice of an individual" (to which Lawes referred in 1855 in the passage lately quoted) never stood in Gilbert's way, while the science which Lawes described as "having hardly a recognised existence" has now received complete acknowledgment.

As the Public Orator of the University of Cambridge (Dr. Sandys) very happily said when presenting Dr. Gilbert to the Chancellor for the honorary degree of Doctor of Science on June 27, 1894, "United with his fellow-worker by bonds of closest concord, he might justly apply to himself and his colleague the words of the younger Pliny: 'There has been no conflict, no contest between us, while each of us, like a true yoke-fellow, has been ever striving, not for himself, but for the common cause.'"[1]

Amongst the foremost of the characteristics which gave to Gilbert's work its chief value was its absolute conscientiousness. Not a statement has gone forth from Rothamsted without the most thorough examination and the caution—sometimes carried even to an extreme—that nothing should be left to probability.' Gilbert's love of accuracy, and his almost feverish desire that nothing should be omitted that might conduce to greater certainty and the elimination of disturbing influences, are well exemplified in the precautions instituted by him in the sampling of soils for analysis, in that of the different root crops, the preparation of the samples, and their ultimate analysis. These circumstances have, in great measure, given to the collection of samples stored in the Rothamsted Laboratory their unique value as materials for reference and comparison.

Attention to detail was necessarily the outcome of this care, and perhaps to some it may seem that detail was, if anything, overdone at Rothamsted. The numerous and comprehensive Tables so well known to those who have followed the work of Rothamsted testify to the minute attention and laborious care bestowed upon the experiments, as does the placing of the results on record in not one form only, but in every way in which they might possibly illustrate a useful point. The many series of diagrams that have issued from the Rothamsted Laboratory further show this same desire, as do the cases of illustrative specimens which were at different times prepared for lectures to the British Association, and for the Paris, Glasgow, and other Exhibitions. Nor was the utility of these records confined to Rothamsted; they and the information they conveyed were open to all who applied. For every inquirer Gilbert had his precise record, and few were the questions that could not have light thrown on them by reference to one Table or another, carefully stored, but at once accessible. Tables were an almost invariable accompaniment of any discussion on an agricultural subject with Gilbert, and all his reports abound with them.

The immense collection of specimens of soil, of crops, of ash samples and the like, amounting to over 45,000, now in the Rothamsted Laboratory, each with its history legibly recorded, and each in its proper place, affords another testimony to Gilbert's unceasing activity and care. His persistency and his firm belief in the necessity for maintaining the continuity of experiments have been already spoken of, and, though he was ever ready to defend to the full any position taken up, after mature consideration, by Lawes and himself—as seen, for example, in the controversy with Liebig on the "mineral theory" and, later, on the assimilation of atmospheric nitrogen by plants—Gilbert was yet very far from being prejudiced. Had it been otherwise, we should not have found him, at the age of over seventy, repeating the experiments of Hellriegel and Wilfarth on nitrogen assimilation by the Leguminosæ, and even carrying on their work a stage further.

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[1] "Nobis erat nullum certamen, nulla contentio, cum uterque pari iugo non pro se, sed pro causa niteretur."—Pliny, *Ep.* iii. 9.

It is indeed worthy of note in this connection that it was the very care and extreme precautions taken by Lawes and Gilbert to eliminate all outside influences which led them in 1857-60 to support the conclusions of Boussingault as to the non-assimilation of atmospheric nitrogen by plants; for, in so doing they altered the biological conditions which were subsequently shown by Hellriegel to be essential to the assimilation going on, and excluded not only extraneous disturbing influences but also the organisms which were found, later on, to be all-important to the process.

Lawes and Gilbert's conclusions, it cannot be too clearly set out, were perfectly justified by their experiments according to the way in which these were carried out and by what was then known, though subsequent research showed that other factors, excluded from their experiments by the conditions, entered into the question. But when this was demonstrated to them some twenty-six years later, they repeated their experiments under the new conditions, acknowledged the position, and pursued the inquiry further.

The same readiness to fall in line with others is shown in the taking up by these men—who had been the pioneers of field experiments—of pot-culture experiments according to the plan now almost exclusively adopted on the Continent. It was a subject of common remark among his scientific brethren how extraordinary it was that Gilbert, at his advanced age, was able to keep himself up to date and informed as to the latest methods of experimental research, of analytical processes, and the like.

Another leading characteristic of Gilbert was his great activity and his assiduous devotion to work. No labour seemed too much for him if it had to do with the Rothamsted experiments. To every visitor, were he young or old, distinguished or still unknown, of English, French, German, or other nationality, scientist or layman, Gilbert was ever ready to impart information about the experiments. This would commence generally with an exposition in the Laboratory and reference to the different diagrams and tables hanging there, and it was then supplemented by a walk round the experimental fields. Gilbert's activity in this respect, even to within the last six months of his life, was most remarkable. Many is the time that I have seen him tire out, in a physical sense, men of little more than half his years. Those who have been privileged to go round the experimental fields with him and to listen to his demonstrations can testify to his mastery of every detail, and his ready elucidation of the most striking features brought out by the different crops. The preparation of the various Memoirs, though the matter of joint consultation between himself and Lawes, was, it is well known, the work of Gilbert, and bears his impress, as also do the "Memoranda" and Field Guide which were put into the hands of visitors. The Tables, Records, Pamphlets, &c., were similarly all in his charge, as also the issue of these from Rothamsted Laboratory to scientific societies, institutions, and individuals.

No holiday was ever taken by him until his work was well in order, the last paper written, and the time come that he could be away without the work suffering. Even then his holiday was often employed in reading papers or in giving lectures on his beloved Rothamsted experiments, and wherever anyone was desirous of being informed about them, or whenever an opportunity occurred of demonstrating the lessons to be drawn from them, Gilbert was at hand, whether at British Association Meetings, in Agricultural Conferences on the Continent, or in more extended trips to Canada or the United States. He it was who thus became the exponent of the Rothamsted experiments. Further, no personal aim or ambition, save that of doing his work well, and no thought of outside and material remuneration ever influenced him. His one idea was Rothamsted and the importance and value of its experiments. Of him it may truly be said he lived for Rothamsted, and in work for Rothamsted he continued to the very day of his death.

The published records of his work in the Rothamsted Memoirs, contributed to the Royal Society, the Royal Agricultural Society of England, and elsewhere, and collected and issued by the Board of Agriculture, form the best guide to the many-sided character of the work carried on at Rothamsted during the fifty-seven years. As an instance of the very complete examination to which each investigation was subjected may be mentioned the important one upon the "Mixed herbage of the Permanent grassland in Rothamsted Park." This, divided into three sections, being (1) the Agricultural, (2) the Botanical, and (3) the Chemical results, forms a most complete discussion of a subject in which Gilbert took a particular interest and related to an experiment which, by the marked character of the different appearances it presented in the field, could not fail to prominently strike the onlooker. It was, it must be remembered, through the Rothamsted experiments that the "mineral theory" of Liebig, which had swept away the "humus theory" of Thaer, was in its turn replaced by the nitrogen theory of "Lawes and Gilbert," which remains with us to this day. To Gilbert we owe an immense amount of knowledge accumulated in regard to soil chemistry and the relations of plant growth and manurial application. He it was who brought out clearly the influence of nitrogen in the production of the non-nitrogenous bodies—the carbohydrates—starch and cellulose in the case of cereals, starch in potatoes, and sugar in root crops.

He further demonstrated the influence of nitrogen on the maturing of root crops, and of potash on the formation of sugar in them. As to the mixed herbage of pasture land, he showed that large amounts of nitrogen were taken up—even in the case of red clover—in the form of nitrates, and that, as more nitrogen was assimilated, so there was a greater amount of the fixed bases found in the ash, these bases being probably present in the plant in combination with organic acids. The function of the fixed bases, such as potash, was to act as carriers of nitric acid. In regard to the bases, however, potash, soda, lime, and magnesia were found to be not mutually replaceable, but the predominance of one or the other affected the produce. Luxuriance of growth was associated with the amount of nitrogen available and taken up, while chlorophyll formation also followed the assimilation of nitrogen. If nitrogen was taken up and chlorophyll formed, then the assimilation of starch and the formation of carbohydrates depended, in the case of grasses, mainly on the amount of potash available.

Not of so retiring a nature as Lawes, Gilbert associated more with scientific men and attended many public functions till quite a late period in his career ; and it was not until the death of Lawes in August, 1900, that he could be said to have withdrawn himself from public life. During that time he had many and most friendly relations with the leading men in different branches of science, and great was his pleasure when he could bring them down to Harpenden and interest them in the Rothamsted experiments. What, perhaps above all, struck them most was his astonishing activity and comparative juvenility. His appearance at the age of eighty bore little indication of physical weakness, and his mind remained active and clear to the last.

When the break in the long association with Lawes came in August, 1900, it was felt by all who knew them that on Gilbert the blow must have fallen most severely, and that work in which the one had been accustomed to look to and rely upon the other could not long be carried on by the one alone. So it could hardly be matter for surprise that signs of failing set in with Gilbert within a year of Lawes' death. But the indomitable perseverance which had characterised him all through never failed him for a moment, and until the very last, with mind still perfectly clear and purpose firmly set, he laboured on, intent on keeping the Rothamsted work going to the end. And so it was, for, though struck down by severe illness while away in Scotland last autumn during his annual holiday, he was enabled to rally for a time, and to devote himself once more to his work. But gradually he became weaker and weaker, and he died on December 23, 1901, in his eighty-fifth year, still busying himself to the last with that to which he had given his life and his energies.

He was laid to rest in Harpenden Churchyard on December 27, close to the companion of his labours who had preceded him, and in that quiet country churchyard, still together, sleep "Lawes and Gilbert," whose memories will be ever associated, and whose works will live long after them. J. Augustus Voelcker.

13 Hanover Square, London, W.

THE MARKET GARDENERS' COMPENSATION ACT, 1895.

The question has not infrequently arisen whether under the fourth section of this Act a tenant, under a contract of tenancy current at the commencement of the Act, who has executed what may be called market garden improvements before the commencement of the Act, January 1, 1896, without having received written notice of dissent by the landlord, is entitled to compensation for them, or whether his right to compensation arises only in respect of such improvements executed after January 1, 1896. Up to the present year there has been no decision on this point. Quite recently, however, the House of Lords have decided that under the fourth section of the corresponding Scotch Act—which is worded exactly the same as the fourth section of the English Act (except that the expression "lease" is used in the Scotch Act where the expression "contract of tenancy" is used in the English Act)—the tenant's right to compensation is restricted to improvements executed after the commencement of that Act; and this decision has been followed as regards the English Act by Mr. Justice Cozens-Hardy, so that, as regards both Acts, the above question must now be answered in the more restricted sense.

The section under consideration runs as follows: "Where under a contract of tenancy ['lease' in Scotch Act] current at the commencement of this Act, a holding is at that date in use or cultivation as a market garden with the knowledge of the landlord, and the tenant thereof has then executed thereon, without having received previously to the execution thereof any written notice of dissent by the landlord, any improvements in respect of which a right of compensation or removal is given to a tenant by this Act, then the provisions of this Act shall apply in respect of such holding, as if it had been agreed in writing after the commencement of this Act that the holding should be let or treated as a market garden."

The facts in the Scotch case[1] were shortly these: Smith was tenant and Callander landlord of a farm of about 359 acres. The farm was held under a lease for nineteen years from Martinmas 1880. The lease was an ordinary agricultural lease, and contained no unusual provisions. About 1884, or soon after, Smith began to cultivate raspberries and strawberries upon part of the land comprised in the lease, and continued to do so until it terminated. It was not seriously disputed that this cultivation was carried on with the knowledge of the landlord and the successive factors on his estate, and without any objection on their part. Upon quitting the farm, Smith claimed compensation in respect of various matters under the Scotch Agricultural Holdings Act, 1883, and the Scotch

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[1] Smith v. Callander, *Law Reports*, Appeal Cases, 1901, p. 297.

Market Gardeners' Compensation Act, including compensation for strawberry and raspberry plants, and buildings erected for the business of a market gardener. A reference followed, and the referee issued a final award by which he found that the tenant was entitled to 720*l.* 16*s.* as compensation in respect of the claim under the Market Gardeners' Compensation Act. The landlord objected to so much of the sum as was awarded in respect of market garden improvements executed before January 1, 1898, the date when the Scotch Act came into operation. The question was fought through the Scotch Courts, and in the early part of this year came up on appeal to the House of Lords. The case was heard before no fewer than six learned lords, four of whom expressed their opinions upon it at some length; but it will be sufficient for the purposes of this note to cite passages from the judgments of the Lord Chancellor (Lord Halsbury), and of Lord Davey. The former is reported to have said :—

"One case contemplated by the framers of the statute is the case of a written agreement. The other case is that, at the time of the passing of the statute, the thing has already been done, and the condition of things is such that the tenant has already with the knowledge of the landlord cultivated the land as a market garden. The Act says that then 'the same provisions shall apply'—that is to say, that for all future improvements, although the landlord has not given his consent in writing, there shall be compensation at the end of the lease."

And the latter (Lord Davey):—

"The scheme of the Act is shortly this—to amend the schedules as regards market gardens in the Act of 1883, first, as to what I may call new market gardens, in cases in which there is an agreement in writing, made after the commencement of the Act, to treat them as market gardens, and, secondly, as to all market gardens in respect of subsequent improvements, provided the landlord has not, after the passing of the Act, given a written notice that he will not be liable for those improvements."

The above decision was followed as regards the English Act by Mr. Justice Cozens-Hardy in the case of Mears *v.* Callender.[1] And as this case involved several other questions of interest to farmers and their landlords, both at common law and under the Agricultural Holdings (England) Act, 1883, as well as under the before-cited fourth section of the Market Gardeners' Compensation Act, 1895, it has been thought desirable to state it at some length. The facts, which are taken from the learned judge's judgment, were as follows :—

"About twenty years ago Mr. Joseph Mears bought of Mr. Wiltshire a farm called Kingwood Farm, in Oxfordshire. It was a purely agricultural holding. For some few years he occupied the farm, but on August 17, 1887, he granted a lease of it to the defendant for seven, fourteen, or twenty-one, years, from Michaelmas 1887, at the yearly rent of 165*l.* The lease contained the usual covenants applicable to a small farm and farmhouse, but it is necessary to call attention to the following provisions, which are not in common form :—'(10) Subject to clause 14, the tenant shall not break up or convert into tillage any meadow or pasture land without the landlord's written consent, and if he shall do so he shall, during the remainder of the tenancy, pay the additional yearly rent of 50*l.* for every acre of land which shall be so broken up or converted into tillage, and so in proportion for any less quantity than an acre, and generally the tenant shall manage and cultivate the farm in a husbandlike and in the best manner, so as not to impoverish any part thereof, and shall leave the same at the end of the tenancy in good heart and condition. (11) If the landlord shall at any time during the said term, by agreement with the tenant, expend any money in draining, building, or other permanent improvements on the said premises, the tenant shall, during the said term, pay to the landlord interest on the sum expended after the rate of 5*l.* per cent. per annum, such interest to be considered as additional rent, and to be recoverable as such by distress or otherwise. (12) The tenant shall not in the last year of the tenancy prepare and sow with a white corn crop more than one half part of the arable land. (13) In the last year of the tenancy the landlord or his incoming tenant shall be at liberty to enter upon the lands for a wheat season so soon as the crop for that year is cleared off, in order to prepare the same for such season, and may also sow seeds among the Lent or summer corn, which the tenant shall harrow in ; and the tenant shall also leave gratis for the landlord or his incoming tenant all the roots remaining unconsumed in the ground, and also all improvements made by the tenant, and all cultivations, dressings, and manures, in consideration of no claim being made by the landlord for similar matters on the tenant now entering. (14) The tenant may at any time during the said term, at his own cost, extend the present kitchen garden part of the said premises, in the manner stated in the lease, and also at the like cost convert into an orchard so much of the meadow land surrounding the said house, as he may think proper. (21) The Agricultural Holdings (England) Act, 1883, shall not apply to the contract of tenancy.'

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[1] *Law Reports*, 1901, 2 Ch., p. 388.

"Shortly after the lease the defendant converted part of the meadow surrounding the house into an orchard. There are now upwards of 1,200 trees in the orchard—apples, pears, plums, and cherries—in good bearing condition. These trees, though not capable of removal, are worth several hundred pounds to anyone taking the farm. The defendant also erected ten glass-houses, in which grapes, peaches, nectarines, tomatoes, and strawberries were grown. From these houses he supplied fruit to Reading and also to Covent Garden, and I think it is clear that he carried on the trade of a market gardener on the premises with considerable success, and with the full knowledge of his landlord.

"The defendant gave notice to quit the farm at Michaelmas, 1901, and he claimed the right to remove the houses and to have compensation for the orchard trees. He pulled down three houses before action brought. There is some conflict of evidence as to the structure of the glass-houses. Upon the whole, I conclude, that as to one of the houses which has concrete sides and was erected in or shortly after 1893, the glass span-roof is not attached in such a way as to constitute it part of the freehold. I think it substantially rests by its own weight upon the concrete wall, and that it could be lifted up and removed without in any way pulling to pieces or damaging the walls. As to the other houses, wooden piles were driven into the ground, on the top of which wide sills were placed which supported the glass span-roofs, except in the case of the vinery, where there was a lean-to roof. The roofs were nailed to the sills or backings, which in turn were nailed to the posts.

"Under these circumstances, questions of importance and difficulty arise for my determination. It is contended on the part of the plaintiff that the defendant is bound to leave the orchard and all the houses without claiming compensation. On the other hand, the defendant claims, both at common law and under the Agricultural Holdings (England) Act, 1883, as enlarged by the Market Gardeners' Compensation Act, 1895, to be entitled to remove or to have compensation for all the glass-houses, and he claims under those Acts, or one of them, to be entitled to compensation for the fruit trees."

"It will be convenient," continued his lordship, "to consider, first, what are the rights of the parties irrespective of the Acts of 1883 and 1895, and next, to what extent their rights are modified or affected by those Acts. Now, at common law, it is plain that the defendant could not cut down or remove the orchard trees, or claim compensation. But as to the glass-houses, a much more difficult question arises. If erected for the mere purpose of pleasure and ornament, and not for the purpose of a trade, they would not be removable. If, however, they were erected, as in the present case, by a market gardener for the purpose of his trade, different considerations arise; and, after considering at some length the old cases on this question, and stating that the whole tendency of the Courts in recent years had been to enlarge the rights of tenants in respect of fixtures," his lordship went on, "unless, therefore, the defendant is precluded by some covenant in the lease, I think he is entitled to remove the glass-houses. But it is contended that by clause 13 the defendant is bound to leave all the houses without claiming any compensation from the plaintiff, these houses being 'improvements' made by the tenant within the meaning of clause 13. Upon the whole, I do not think this contention can prevail. I think clause 13 only applies to 'similar matters' to those in respect of which the landlord made no claim when the defendant entered—in other words, to the tillages, &c., in respect of which, according to the custom of the country, payment would otherwise have to be made to an outgoing tenant of an agricultural holding; I cannot read them as applying to extensive houses of the nature of trade fixtures erected by a market gardener on the property.

"The next question is as to the effect of the Acts of 1883 and 1895. Now the Act of 1883 divides improvements into three classes: (1) those to which the consent of the landlord is required; (2) those in respect of which notice to the landlord is required; and (3) those which require neither consent nor notice. By section three, compensation under the Act is not payable in respect of improvements of the first class, unless the landlord has previously consented in writing to such improvements, and any such consent may be given by the landlord unconditionally or upon such terms as to compensation or otherwise as may be agreed upon between the landlord and the tenant, and in the event of any agreement being made between the landlord and the tenant any compensation payable thereunder shall be deemed to be substituted for compensation under this Act. The improvements of the first class include planting of orchards or fruit bushes and erection or enlargement of buildings. By sec. 34, where after the commencement of the Act a tenant affixes to his holding any engine, machinery, fencing, or other fixture, or erects any building for which he is not under this Act or otherwise entitled to compensation, then such fixture or building shall be the property of, and be removable by, the tenant before or within a reasonable time after the termination of the tenancy. By sec. 54 the Act applies to a holding such as the defendant's. By sec. 55 any contract, agreement, or covenant made by a tenant by virtue of which he is deprived of his right to claim compensation under this Act in respect of any improvement mentioned in the first schedule hereto (except an agreement providing such compensation as is by this Act permitted to be substituted for compensation under this Act) shall, so far as it deprives him of such right, be void both at law and in equity.

"I am relieved from the necessity of considering the effect of sec. 4 of the Act of 1895, which confers certain benefits upon market gardeners holding under a current tenancy. For since this case was argued before me, it has been held by the House of Lords in Smith *v.* Callander, that under a precisely similar section in the Market Gardeners' Compensation (Scotland) Act, 1897, no right to compensation is given except in respect of improvements made after the Act. The consequence is that I must put aside the Act of 1895, and consider only the Act of 1883. Now as to the glass-houses, the written consent of the landlord was not obtained, and the Act does not help the plaintiff. The attempt in the lease to exclude the Act of 1883 succeeds as to sec. 34, which is not hit by sec. 55. But the landlord's consent in writing to planting the orchard was given by the lease, and there is nothing is clause 13 which sufficed to deprive the tenant of his statutory right to compensation. If, however, my view of the true construction of clause 13 is not correct, then it seems to me that sec. 55 of the Act of 1883 applies, and that the contract by which, on that hypothesis, the tenant is said to be deprived of his right to claim compensation is void both at law and in equity. A landlord cannot impose as a condition of his consent the term that no compensation shall be paid. The Act prohibits this."

The result was that the plaintiff (the landlord) failed in his contentions, and the defendant (the tenant) was entitled (*a*) to compensation for the orchard trees, and (*b*) to remove the glass-houses. S. B. L. Druce.

14 Old Square, Lincoln's Inn, W.C.

THE RATING OF AGRICULTURAL LAND.

By an Act of the last session of Parliament (1 Edward VII. ch. 13), the operation of the Agricultural Rates Act, 1896, which would otherwise have ceased on March 31, 1902, is continued for a further four years until March 31, 1906.

The policy of the Act of 1896, whereby agricultural land is rated at one-half of the rate in the 1*l*. payable in respect of buildings and other hereditaments, is very fully discussed in the Final Report[1] of the Royal Commission appointed in August 1896 to inquire into "the present system under which taxation is raised for local purposes," and it may be interesting to give a summary of the views on this subject expressed in the Majority Report signed by the Chairman, Lord Balfour of Burleigh (with certain reservations), Lord Cawdor, Lord Blair Balfour, Sir John Hibbert, Mr. J. Lloyd Wharton, Mr. C. B. Stuart-Wortley, Mr. Cornelius Dalton, Mr. C. A. Cripps, Mr. Harcourt Clare (Town Clerk of Liverpool), Mr. T. H. Elliott (Secretary of the Board of Agriculture), Mr. E. Orford Smith (Town Clerk of Birmingham), and Mr. James Stuart.

Under the heading of "The Classification of Property for Rating Purposes" (Chapter viii. page 33), the Commissioners observe that the policy of the Act of 1896, whereby land is rated at one-half, and which has been the subject of so much misrepresentation, was only a measure of justice which had been too long delayed.

The theory which underlay the Act of Elizabeth, upon which the whole system of local rating was founded, seems to have been that the rates were to be a kind of local income tax, towards which each member of the community should contribute according to his means. Attempts were made from time to time to give effect to the Act, but from various causes it became the custom only to levy the rate in respect of the real property within the parish. This custom had not, however, received any sanction from the Law Courts or from Parliament, and in the year 1839 the Court of Queen's Bench decided that, under certain circumstances, some kinds of personalty were in law still rateable.

In the following year the Poor Rate Exemption Act was passed, in the preamble of which the Act of Elizabeth was recited, the enacting clause being in the following words: "It shall not be lawful for the overseers of any parish, township, or village to tax any inhabitant thereof, as such inhabitant, in respect of his ability derived from the profits of stock-in-trade or any other property, for or towards the relief of the poor."

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[1] Parliamentary Paper Cd. 638 of 1901.

The effect of this Act was to relieve from liability to local rates all property other than immovable property. When first passed the Act was to remain in force for one year, and was avowedly intended to afford time for the re-consideration of the whole question of liability to contribute to the cost of local services. No such comprehensive dealing with the subject was ever undertaken, and the Poor Rate Exemption Act has been continued in the Expiring Laws Continuance Act every year since 1840.

During this period protective duties were levied on the importation of agricultural produce, and when these were withdrawn in 1846 agriculturists were greatly affected by the change of policy. The late Professor Sidgwick says: [1]

> "During the most important part of the period that we have to consider down to 1846, the owners of agricultural land had the advantage of protective duties on agricultural products; and it was certainly as much a settled principle of our policy to prohibit or impede the importation of grain when the price was below a certain figure as it was to throw the burdens of local taxation on real property. I think that the abandonment of this principle in 1846 gave the owners of agricultural land an equitable claim to be relieved from such part of the special burden of local taxation as it would have been inequitable to impose on them if the system of local taxation had then been arranged *de novo*; and that the interval of time that has elapsed since 1846 is not sufficient to impair materially the force of this claim, especially since the tendency of free trade to lower the value of agricultural land has only been gradually realised. I conclude, therefore, that the principle on which partial relief from rates was granted to the owners of agricultural land in 1896 is sound from the point of view of equity. This conclusion is independent of the economic objection to special onerous rates on agricultural land as discouraging the investment of capital in agriculture. The force of this objection would remain unaltered, even if the question of equity were otherwise decided."

The representatives of the agricultural ratepayers have never ceased to complain of the unfairness of the burden laid upon them in respect of the amount they have had to contribute to local funds, and to urge that the proportion levied from agricultural property is, if calculated upon its full net annual value, greatly in excess of that of other classes of ratepayers, whether considered from the standpoint either of ability to contribute or of benefit to be received from the expenditure of the local funds.

In view of the evidence laid before the Royal Commission on Agriculture (1893), that Commission expressed the opinion in their Second Report "that in order to place agricultural lands in their right position as compared with other rateable properties, it is essential that they should be assessed to all local rates in a reduced proportion of their rateable value. If the existing precedents in England and Scotland are followed, they would be so assessed at one-fourth only of their rateable value." The evidence received by the Local Taxation Commission supports the view thus enunciated.

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[1] Memoranda on Classification and Incidence, &c., p. 112 (C. 9528 of 1899).

To some extent these grievances have been recognised by Parliament, and frequent attempts to secure a more equitable distribution of local burdens have been made from time to time. The method pursued has invariably been to provide for the assessment of land, as variously defined, at a proportion only of its full annual value, or, what amounts to the same course, to provide for the levy of differential rates in the pound thereupon.

Some of the members of the Local Taxation Commission were of opinion that this system should be extended, and that in a method of general classification of properties, having some relation to considerations such as the benefit which accrues to the occupier, and the question of whether the assessment of the properties is any real test of the ability of the occupiers to bear taxation, would be found a solution of the anomalies and difficulties which exist in our present system.

The public enactments in force at the present time for England and Wales, in pursuance of which properties are classified for rating purposes, or rates differing in amount are levied, are the Lighting and Watching Act, 1833, the Public Health Acts, the Public Libraries Acts, and, as temporary measures operative until March 31, 1906, the Agricultural Rates Act, 1896, and the Tithe Rentcharge (Rates) Act, 1899.

The various provisions made with regard to agricultural land, except those contained in the Agricultural Rates Act, 1896, are shown in the following Table :—

Rate	Rating Authority	Spending Authority	Area in which levied	Differential Rating
General District	Urban District Council	Town and other Urban District Councils	Urban District or, in certain cases, a part of the district	A quarter of the net annual value
Rates for special expenses of Rural District Councils	Overseers of the Poor	Rural District Councils	Parish or part of parish forming contributory place	Do.
Water Rate .	Urban and Rural District Councils	Urban and Rural District Councils	Urban District or contributory place	Do.
Lighting Rate .	Overseers of the Poor	Parish Councils or Lighting Inspectors	Parish or part of parish . . .	The rate in the pound on houses, buildings, and property other than land is to be three times greater than the rate on land
Public Library Rate	Do.	Parish Councils .	Parish . . .	An allowance of two-thirds of the sum assessed

Land is not, however, the only rateable property which has been granted differential treatment. In England and Wales, canals, railway lines, land covered with water, tithes and tithe rentcharges, are entitled to the same treatment as agricultural land, except in the case of the Lighting and Public Library Rates, and the Rates leviable in the Metropolis. In Scotland, canals, canal basins and towing paths, railways and tramways (excluding stations, depôts, and buildings), the underground pipes of gas and water companies, salmon fishings, bridges, frontages, and ferries not being private property, are, in burghs, placed in the same position as agricultural land.

The Commissioners consider it to be well established that in view of the character of agricultural property, the amount of the produce and profits derivable therefrom, and the relative extent to which benefits accrue to the property and to its occupier by reason of the expenditure incurred by the Local Authorities, it would be inequitable that rates should be paid in respect of it on the basis of its full annual value.

It is not so easy to arrive at a distinct conclusion as to the proportion of the full rateable value which should be taken as the basis of contribution in the case of agricultural land. In practice it is not possible to effect any very exact apportionment of burdens, even as between particular classes of ratepayers, and still less so as between individuals. Such measures only can be taken as will in corroboration with other methods of adjustment give approximately the desired results. But the Commissioners suggest, as regards England and Wales, that for all burdens which are of an onerous character, and for the cost of the maintenance of local highways, agricultural land should be assessed at one-half of its rateable value, and that in respect of other burdens, where the case of the agricultural ratepayer is dependent not only upon his inferior ability to pay but also upon the meagre extent to which he is benefited by much of the local expenditure incurred, he should continue to be rated at one-fourth, as under the Public Health Act, 1875, and other similar enactments.

The assessment of agricultural land in the manner proposed would, however, in the absence of assistance from extraneous sources, entail an additional burden upon non-agricultural ratepayers, varying in amount according to the proportions of the non-agricultural property in the rating area, whilst in those areas in which rateable property consists for the most part of agricultural land the position of the ratepayers would practically remain unchanged.

If the system of local taxation were finally established upon a sound and equitable footing, the question would be one merely between the various classes of ratepayers amongst themselves; but, as it is, the classification of agricultural land, unaccompanied by any grant, either from the consolidated fund or from the produce of existing taxes, would only afford a very partial remedy for existing grievances, and would accentuate the complaints and increase the burdens of other classes of the rated community.

Under existing circumstances, therefore, the Commissioners see no alternative but, for the present, to provide for the deficiency arising from the classification of agricultural land in the manner proposed, as to the equity and propriety of which they are practically unanimous in opinion, by means of grants out of moneys provided by Parliament. Taking into account the general relations between rateable and non-rateable property, the advantages which attached to the possession of real property in the way of exemptions from Death Duties up to 1853, and the constant tendency on the part of the legislature to impose new burdens on rateable property, they consider that the estate duties on personalty form by far the most appropriate fund for the purpose.

PRESERVATIVES AND COLOURING MATTERS IN FOOD.[1]

A DEPARTMENTAL Committee was appointed by the Local Government Board in 1899 to "inquire into the use of preservatives and colouring matters in the preservation and colouring of food, and to report (1) whether the use of such materials or any of them for the preservation and colouring of food, in certain quantities, is injurious to health, and, if so, in what proportions does their use become injurious; (2) to what extent, and in what amounts, are they so used at the present time?" The Committee consisted of the Right Hon. Sir Herbert Maxwell, Bart., M.P. (Chairman), Professor Thorpe, F.R.S., Principal of the Government Laboratory, Dr. H. T. Bulstrode, of the Local Government Board, and Dr. F. W. Tunnicliffe, with Mr. C. J. Huddart as Secretary.

The Committee have now presented their Report and Minutes of Evidence, the whole forming a Blue-book of nearly 500 pages. Dr. J. Augustus Voelcker and Professor McFadyean gave evidence before the Committee as witnesses nominated by the Royal Agricultural Society.

Amongst the antiseptic agents specified by the Committee as employed or said to be employed in the preservation of food are boric or boracic acid and borates; so-called "boron preservatives"; sulphurous acid and sulphites, fluorides, salicylic acid, benzoic acid or benzoates, formalin or formaldehyde. The boron preservatives are preparations of borax and boracic acid (with or without the admixture of other preservative ingredients, such as salt, saltpetre, sugar, carbonate of soda, etc.), and are generally sold in the form of a white powder (sometimes, however, coloured with a coal-tar dye) under a great variety of fanciful names, which as a rule afford no clue to their real nature. They are used largely for dairy produce (especially in milk, butter, and cream), for margarine, ham, bacon, sausages, and preserved meat foods generally, and to a much smaller extent in beverages.

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[1] Report of the Local Government Board Departmental Committee on the use of Preservatives and Colouring Matters in Food. [Cd. 833.]

The Committee also state that the most commonly used colouring matter for dairy produce is annatto, a vegetable extract from *Bixa orellana.* This and certain other yellow colouring matters of vegetable origin (as turmeric, saffron, etc.) have generally been considered harmless in the quantities employed, but they are gradually being superseded by coal-tar yellows, the action of which upon the human system is not fully known.

The following are the Recommendations of the Committee :—

(A). That the use of formaldehyde or formalin, or preparations thereof, in foods or drinks be absolutely prohibited, and that salicylic acid be not used in a greater proportion than 1 grain per pint in liquid food and 1 grain per pound in solid food. Its presence in all cases to be declared.

(B). That the use of any preservative or colouring matter whatever in milk offered for sale in the United Kingdom be constituted an offence under the Sale of Food and Drugs Acts.

(C). That the only preservative which it shall be lawful to use in cream be boric acid or mixtures of boric acid and borax, and in amount not exceeding 0·25 per cent. expressed as boric acid. The amount of such preservative to be notified by a label upon the vessel.

(D). That the only preservative permitted to be used in butter and margarine be boric acid or mixtures of boric acid and borax, to be used in proportions not exceeding 0·5 per cent. expressed as boric acid.

(E). That in the case of all dietetic preparations intended for the use of invalids or infants chemical preservatives of all kinds be prohibited.

(F). That the use of copper salts in the so-called greening of preserved foods be prohibited.

(G). That means be provided, either by the establishment of a separate Court of Reference or by the imposition of more direct obligation on the Local Government Board to exercise supervision over the use of preservatives and colouring matters in foods, and to prepare schedules of such as may be considered inimical to the public health.

Dr. Tunnicliffe dissents from Recommendation F, and recommends instead "that the presence of copper in these preserved vegetables be in every case declared and that its amount be restricted to half a grain of metallic copper per pound."

FRANCIS DUKE OF BEDFORD.

BORN JULY 17, 1765; DIED MARCH 2, 1802.

THROUGH the generous kindness of the present Duke of Bedford, the Royal Agricultural Society has recently come into possession of an interesting relic of the old Board of Agriculture, which fulfilled, a century ago, functions analogous to those of the Royal Agricultural Society to-day.

I have already given, in a former Volume of this Journal, a sketch of the general history of that Board (Volume for 1898, pp. 1 to 41); but the presentation to the Society of a bust of one of the most distinguished members of the Board—Francis, Duke of Bedford—may be the excuse for the bringing together in these pages of some facts connected with that famous agriculturist.

Francis, fifth Duke of Bedford, born in London on July 17, 1765, succeeded his grandfather, Duke John, on January 15, 1771, when he was a boy of five. He was admitted in 1774 to Westminster School, and in 1780 to Trinity College, Cambridge, after which he did the then usual Grand Tour, returning from the Continent in August 1786, a few weeks after attaining his majority. He took his seat in the House of Lords on December 5, 1787; but it was not for some years that he nerved himself to take part in debate. He was a friend of Fox, whom he accepted as his political leader, and he had a famous quarrel with Burke, versified in the *Anti-Jacobin* and caricatured by Gillray. Twice, in 1797 and 1798, he moved, in the House of Lords, Addresses to the King praying him to dismiss his Ministers: on neither occasion successfully. It was not, however, by his Parliamentary efforts that he won the fame and distinction that left his friends and the country mourning when he died, on March 2, 1802, at the early age of 36, after an operation for strangulated hernia.

The Duke seems from his first coming into possession of the family estates to have recognised the duty that lay upon a great and highly-placed landowner to encourage the better practice of agriculture; and as it happened, agricultural improvements were then very much in the air. The establishment of the Board of Agriculture in 1793 gave an added stimulus to this cult; and the adhesion of Duke Francis to the Board was naturally sought by its energetic founder, Sir John Sinclair. The Duke's name appears second on the list of Ordinary (as distinct from *ex-officio*) Members of the Board in the Charter dated August 23, 1793, the original of which is now in the Royal Agricultural Society's possession.

The famous Woburn Sheep-shearings commenced soon after, and the Duke gathered round him at the Abbey on these occasions all the distinguished agriculturists of the day. Arthur Young's

Autobiography,[1] first given to the world three years ago, makes frequent mention of his visits to Woburn and of the guests he met there; and contemporary publications are full of references to the Sheep-shearings and the interest they excited in the farming world.

The Duke's sudden and premature death came, therefore, as a severe blow to his agricultural friends and colleagues; and their feelings of sincere and unaffected regret are reflected in the subjoined resolutions of the Board of Agriculture, which I have extracted from the old minute-books now in my custody:—

BOARD, *March* 9, 1802.—The death of the late Duke of Bedford having been communicated to the Board this day, being the first meeting held since that event,

Resolved unanimously, that the General Committee be specially summoned to meet on Thursday next, for the purpose of considering the propriety of some publick testimony from this Board of the high sense which they entertain, not only of his Grace's exertions as one of their Members from their first Establishment, but also of the great advantages which the Country has received from his Grace's unwearied exertions to promote and improve the National Agriculture in all its branches.

GENERAL COMMITTEE, *March* 11, 1802.—Took into consideration the reference to this Committee of the propriety of some publick testimony from the Board of the high sense which they entertain of the late Duke of Bedford's exertions as a Member from their first establishment, and of the great advantages which the Country has received from his Grace's unwearied exertions to promote and improve the National Agriculture in all its branches.

Resolved unanimously, that the following inscription be prefixed to the Volume of Communications now printing:—

"To the memory of the most noble Francis, late Duke of Bedford, this Volume of Communications is inscribed by the Board of Agriculture, as a token of gratitude for the benefits experienced by the Board from his Grace's uniform attention to its interests since its first establishment, and as a testimony of the sincerity with which they, in common with every friend to the improvement of the Country, lament the loss of the most judicious and munificent promoter of the National Agriculture in all its Branches. "By order of the Board,

"CARRINGTON,

"*President.*"

Resolved unanimously, that a Medal be struck in honour of his Grace Francis Duke of Bedford. . . .

Resolved, that the Committee recommend to the Board to apply to his Grace the Duke of Bedford to be permitted to have a Bust of his deceased brother to be put up in their Board Room.

There were further resolutions about the medal [2] to be struck in Duke Francis's honour, which need not further concern us, except that it may be added that the original dies (obverse and reverse) of the medal decided upon, and executed by Mr. J. Milton from the design of Mr. J. Planta, are in the possession of the Royal Agricultural Society.

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[1] *The Autobiography of Arthur Young.* Edited by M. Betham-Edwards. (Smith, Elder & Co., 1898.)

[2] The Bath and West of England Society, of which Duke Francis was the President, followed suit with similar resolutions of regret at an Extraordinary General Meeting, held on March 23, 1802 (called at the instance of Lord Somerville), and decided to have a Bedfordean Medal of their own. (Transactions, Vol. X. 1805, pp. 355 *et seq.*)

The Board of Agriculture, meeting again a week later, on March 16, 1802, ordered a copy of the General Committee's resolutions to be communicated to the new Duke of Bedford (John, brother of Francis), with a request "that his Grace will be pleased to permit the Board to have a bust of the late Duke to be placed in their Board Room." The text of the original letter of Lord Carrington, then President of the Board, to the Duke of Bedford, and of the Duke's reply, has fortunately been preserved; and as the letters have never been published, they may well find a place here, if for no other reason than their interest as specimens of the grandiose epistolary style of the period :—

Lord Carrington to the Duke of Bedford.

March 19, 1802.

My Lord,—I have the honour to send enclosed to your Grace a copy of the Resolutions entered into by the Board of Agriculture, in which they have endeavoured to do justice to the feelings excited in the breast of every Member by the late unfortunate event.

They who were almost daily witnesses of the zeal and abilities of the noble Duke, now no more, exerted in the most interesting and excellent of all pursuits, may be perhaps considered as the best qualified to appreciate his merits, as well as to estimate the National Advantages which have been produced by his Grace's public spirit, judgment and liberality.

The Board, anxious to perpetuate the remembrance of a Member so dear to them, have desired me to request that your Grace will be pleased to permit a Bust of the late Duke to be placed in their Board Room. I have the honour to be, &c.

(Signed) CARRINGTON.

His Grace the Duke of Bedford.

The Duke of Bedford to Lord Carrington.

Arlington Street : March 19, 1802.

My Lord,—I have this morning received the Honour of your Lordship's Letter, enclosing a Copy of Resolutions entered into by the Board of Agriculture, and communicating their desire to have a Bust of my late lamented Brother placed in their Board Room.

This flattering testimony of approbation, from a Body so highly useful and respectable, of those efforts which were directed to a great national interest, by a person who was dear to me in every sense, deeply impresses me with the strongest feelings of gratitude.

I had long been a witness, My Lord, to his unvarying anxiety, and his unremitting zeal to promote every object that could tend to the improvement of Agriculture as a science, or that could increase the practical benefits to be derived from so praise-worthy a pursuit, and even in this hour of private sorrow it is much consolation to me to know that his conduct in this important particular has been so justly appreciated, and the approbation of it recorded in so flattering a manner.

May I be permitted through your Lordship to offer my warmest thanks to the Board of Agriculture, and to assure the Board that I shall feel a pride and an unbounded satisfaction in having it in my power to contribute to their wish of perpetuating the memory of him, who was one of the most earnest friends of the Institution.

I have the honour to be, &c.

(Signed) BEDFORD.

The Right Hon. Lord Carrington,
President of the Board of Agriculture.

Duke John seems to have accepted for himself the duty of providing the bust desired by the Board ;[1] for, some eleven months after, the following resolution appears in the Minute Book :—

BOARD, *February* 15, 1803.—Read the following letter from his Grace the Duke of Bedford, accompanied with a Bust of the late Duke, which his Grace has presented to the Board:—

Arlington Street: Dec. 1, 1802.

Sir,—Mr. Nollekens informs me that the Bust, executed for the Board of Agriculture, is now finished, and I have, in consequence, requested him to take it to Sackville Street. The Board, I flatter myself, will do me the honour to accept it as a grateful testimony on my part of the sense I must ever entertain of the gratifying and honourable manner in which they have been pleased to acknowledge and commemorate the services of my late Brother in all things connected with Agricultural pursuits.

(Signed) BEDFORD.

To Arthur Young, Esq.

Resolved unanimously, that the President be requested to write to his Grace the Duke of Bedford to convey the thanks of the Board for his Grace's letter, as well as for the Bust, which affords so striking a resemblance of the late Duke, and which they never can contemplate without recollecting their obligations to so warm and able a friend of this Institution, and to so munificent encourager of the Agriculture of the Kingdom.

Read also a letter from Mr. Nollekens. Resolved, that the Secretary do write to Mr. Nollekens to request his attendance at the Committee on Friday next to consider a proper place in the Board Room for his Grace's Bust, and to order a proper Pedestal for the same.

GENERAL COMMITTEE, *February* 18, 1803.—Mr. Nollekens, the sculptor who made the Bust of the late Duke of Bedford, which has been presented to the Board by the present Duke, attending the Committee, and having given his opinion on a proper situation for the Bust in the Board Room, resolved, that it be placed in the Niche between the Chimney and the Window.

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[1] A replica of this bust was also presented by Duke John to the Bath and West of England Society, and at the Annual Meeting of members held on December 14, 1802, the Bedfordean Committee reported: "That Bust having been received, the Committee cannot avoid expressing their opinion that it is in every view one of the finest specimens of art ever produced in this country, and they trust that the Society will approve of the resolution which they have taken, to fix it on a marble bracket over the President's Chair in the most conspicuous part of the Society's room." (Transactions, Vol. X. 1805, p. 359.)

Resolved, that the following be the inscription:—

FRANCIS DUKE OF BEDFORD.
PRESENTED
TO THE BOARD OF AGRICULTURE
BY
JOHN DUKE OF BEDFORD,
1802.

In this position the bust [1] presented by the Duke of Bedford and the mahogany pedestal provided for it by the Board were duly placed, as may be seen in the reproduction in the Volume of this Journal for 1898 (opposite page 21) of the coloured engraving, by Pugin and Rowlandson, of the Board Room at 32 Sackville Street, which originally appeared in 1809 as one of the illustrations of Ackermann's *Microcosm of London.* There the bust and pedestal remained until the dissolution of the Board in 1822, when by resolution dated June 7, 1822, they were ordered to be returned to the Duke of Bedford. Nollekens' original bust is still in the Woburn Sculpture Gallery on a marble pedestal in harmony with the other busts, but the present Duke has very generously permitted the Society to have the old mahogany pedestal made in 1803, and has presented it for the adornment of its Council Room with a plaster cast of the bust of which the history has been told above.

Probably none of Duke Francis's contemporaries were in so good a position to assess his claims to agricultural fame as Arthur Young, the Secretary of the Board of Agriculture, and this short notice may therefore fitly close with the eulogium of the Duke written by Young for Vol. xxxviii. of his well-known *Annals of Agriculture* (Bury St. Edmunds, 1802):—

> The agricultural world never perhaps sustained a greater individual loss than the husbandry of this Empire has suffered by the death of the Duke of Bedford. I cordially wish that my pen was equal to doing justice to the proof of that assertion; it never was equal to it; much less so at present under the pressure of private regrets, added to those of a more public nature.
>
> The late Duke of Bedford came to the management of his vast property in 1787, and gave very early signs of that regulated attention to business and order in the enlightened management of landed property which ensured much of the celebrity that followed; but his peculiar fondness for farming was not very manifest till 1793. In July, 1795, I passed four days at Woburn, and then found many signs of a decided attention to agricultural pursuits.

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[1] An engraving of this bust figured as the frontispiece of T. Bachelor's *General View of the Agriculture of the County of Bedford,* issued by the Board of Agriculture in 1803, and it (or something like it) appears also—amongst the art objects surrounding Mr. Garrard, A.R.A.—in the well-known picture of the Woburn Sheep-shearing published in 1811.

The first sheep-shearing, celebrated by a numerous company, was in June, 1797, and continued to be held in the same month every succeeding year, but with greater increasing numbers and *éclat,* till it became at last by far the most respectable agricultural meeting ever seen in England; that is, in the world; attended by nobility, gentry, farmers, and graziers from various parts of the three kingdoms, from many countries in Europe, and also from America. Through all this period the Duke was advancing rapidly the improvement of his great farm, increasing and wonderfully ameliorating the breeds of live stock, in which he was singularly skilled, and highly successful in all his exertions. His system of irrigation was conducted with great felicity of invention, and executed with uncommon energy; of this and many other experiments I have preserved a detail, which has been kept for further improvements by his own desire.

But the ample mind of this great man meditated much more important plans. In order that his experiments might be more varied and extensive, and applicable to a more general utility, he engaged a gentleman of most respectable talents to superintend the whole; fixed the plan of an establishment for agricultural education; arrranged the idea and determined the execution of a botanical garden and a laboratory; that the improvement and cultivation of his farm might go hand in hand with those scientific inquiries which would offer the most precious opportunity to students of every description to avail themselves of all the assistance which liberality and talents could confer. Such an establishment, under the control of a mind in which extent of views, clearness of understanding and severity of judgment were happily combined, could not fail of proving of so decided a benefit to the agriculture of the whole kingdom that, much as the Duke of Bedford has been admired for what he effected, it may be safely asserted that he saw but the morning of that fame which would have attended the maturity of his exertions in this first and most respectable path of publick utility.

The concourse of farmers from all parts of the kingdom at the annual meetings would have enabled them to perceive the admirable tendency of all these establishments in the midst of an immense farm, on which was to be seen the best live stock of every sort, and an increasing repository of mechanical inventions brought in regular practice to the test of experience; they would have been eager to place their sons for instruction in the midst of all that fortune, liberality, and knowledge could provide.

The personal qualities of the man would have shed a happy influence on the whole progress of these noble undertakings. Affable and engaging in his manners—mild, serene, and beneficent in his temper; none ever approached him but with pleasure, or quitted him but with regret; the firmness of his mind would have kept all in order, and an unvarying good-humour would have given the wings of inclination to the feelings of respect.

From the first establishment of the Board of Agriculture, in the charter of which his Grace was named a member, his attendance at the meetings of the Board was as regular as his many avocations would admit; he had an high opinion of the great national utility of that institution, and, being a member of the Committee of the House of Lords which sat on the consideration of the dearth of provisions, his Grace moved the requisition to the Board to report to their Lordships on the best means of encouraging the conversion of grass lands to arable. When the result of that enquiry comes fully before the publick, it will be found that the Duke of Bedford was the original cause of expanding much private knowledge for the benefit of the publick.

One observation must be permitted. It deserves the attention of the great and wealthy. The Duke of Bedford attained in five years a degree of fame and publick estimation which, perhaps, no other line of exertion could equally have bestowed. Of the thorny paths of politicks nothing shall be added; whatever party a man takes, opposition and opprobrium too often attend his steps; the purest motives are oftentimes mistaken, the greatest talents vilified, and the most splendid services are sometimes rewarded with ingratitude. The votaries of the plough move in a happier sphere; the Duke of Bedford was rearing on this foundation a temple of fame which promised to be durable; and it may be questioned whether he would not have attained (had it pleased Divine Providence to spare his life) a degree of estimation, respect, and general influence superior to all that would have attended the most successful endeavours in any other path of human exertion.

ERNEST CLARKE.

13 Hanover Square, W.

STATISTICS AFFECTING BRITISH AGRICULTURAL INTERESTS.

IT has for many years been customary to include in the Journal the prices of corn and other produce, foreign food imports, and records of meteorological phenomena. The practice began long before the official agricultural returns assumed their present elaborate character, and indeed dated from the appearance, in the Volume of the Journal for 1855, of a noteworthy contribution on "Agricultural Statistics" by the late Mr. Chandos Wren Hoskyns.

At that time the public mind had become thoroughly aroused to the need of a systematic collection of agricultural economic data, there being then no method of arriving with any degree of certainty at the annual acreage or produce of home grown corn, the importations of which had in 1855 reached an annual average of ten million quarters. Apparently the immediate inspiration of Mr. Hoskyns's article was the issue in June 1855 of the Report and Minutes of Evidence of the House of Lords Select Committee on Agricultural Statistics.

Mr. Hoskyns relates that in 1847 Mr. Milner Gibson, as Vice-President of the Board of Trade, introduced into the House of Commons a Bill providing for the collection of agricultural statistics in England and Wales. By this Bill the duty of collecting agricultural statistics was to be entrusted to the Registrar-General of Births, Marriages, and Deaths; the Superintendent Registrars throughout the country being charged with the appointment of "agricultural enumerators" in their respective districts. The Bill failed to reach a second reading, and was abandoned by the Government owing to the lack of interest taken in the subject.

In 1853 and 1854 the Highland and Agricultural Society of Scotland successfully inaugurated a system for the collection of the agricultural statistics of Scotland, and in 1854 a like experiment was tried in certain counties of England and Wales, the machinery of the Poor Law being employed for the purpose. The experiment failed, and the failure was attributed to the employment of the Poor Law inspectors, which was quite enough to arouse the suspicions of farmers as to the object of the inquiries made, and so to defeat the enterprise.

In consequence of a resolution of the House of Commons, which was carried by Mr. (afterwards Sir James) Caird, M.P., on June 4, 1864, the Board of Trade began, in 1866, to collect and publish statistics as to the acreage under crops and the numbers of live stock throughout Great Britain, and the returns for the purpose were obtained by officers of the Inland Revenue under the system that is still in force. Statistics thus obtained were published by the Board of Trade annually from 1866 to 1882; from 1883 to 1889 they were issued from the Agricultural Department of the Privy Council, the duties of which were transferred to the Board of Agriculture, created by Act of Parliament in 1889. In 1884 the collection of statistics as to the approximate yield of corn and other crops in Great Britain was undertaken by the Agricultural Department of the Privy Council by means of specially appointed local estimators, and similar returns under the same plan have since 1889 been issued yearly by the Board of Agriculture.

It should be mentioned that the furnishing of the particulars necessary for the returns has never been made compulsory; but the initial prejudices on the part of occupiers have diminished year by year, until in his last report Major Craigie was able to state that the "absence of voluntarily supplied information necessitated resort to estimates in less than 3 per cent. of the total number of individual returns, and the area of land on which the distribution of crops had thus to be estimated in default of returns was only 3·4 per cent. of the cultivated area."[1]

The publication of the Journal annually, instead of quarterly, has necessitated a revision of the statistics as given in tabular form. The practice of the Board of Agriculture is to publish, as the figures become available, preliminary statements, which are afterwards embodied in the Board's Annual Agricultural Returns, and such statements have recently been included in each quarterly part of the Journal. Taking the year as a whole, duplication of figures was to some extent inevitable; but in the present annual volume the finally corrected official statistics appear in one complete series of tables, on pages 378 to 393. Certain tables hitherto given have been omitted as redundant, whilst some of the tables have been expanded to include additional particulars. In all cases, however, care has been taken that the alterations made do not destroy the value of the tables for the purposes of their comparison with previous years.

In Tables I. and II., on pages 378–381, will be found the usual records as to the acreage under crops and grass, the numbers of live stock, and the estimated total produce and yield per acre of the principal crops. This information has hitherto been presented in one table, with the omission of the final "thousands"; but the present tables have been readjusted to admit the complete figures, a plan that is adopted throughout.

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[1] *Agricultural Returns for* 1900, p. vi [*cd.* 576].

The following paragraphs, which bear upon the first two tables, are taken from Major Craigie's introductory report on the agricultural returns for 1900 :—

PRODUCE OF CROPS IN GREAT BRITAIN IN 1900.

Estimated Yield of Wheat.—The total quantity of Wheat grown in Great Britain in 1900 was estimated at 6,580,000 quarters, being at the rate of 28½ bushels per acre on 1,845,000 acres. On five previous occasions since 1885 a lower yield per acre has been recorded, but only twice, viz. in 1893 and 1895, has the total estimated production been smaller. The falling-off from the average of the previous ten years, which amounted for the whole of England to 1¾ bushels per acre, was shared by nearly all the counties in three out of the four agricultural divisions and in half the counties of the remaining—northern—division. The greatest deficiency, south of the Tweed, was reported from Norfolk, where the Wheat crop was estimated to be 5 bushels under the average. In Wales, on the other hand, the yield was estimated at more than 1½ bushels above the average, while in Scotland in those cases in which the crop was grown at all the results were very variable, giving for the country generally a deficiency of ½ a bushel per acre.

Estimated Yield of Barley.—The estimated yield of Barley was below the average by rather more than 2 bushels per acre for Great Britain; a deficiency of 2½ bushels in England, and nearly 3 bushels in Scotland, having to be set against an excess of 1¾ bushels in Wales. The British yield of 31½ bushels is lower than in any previously recorded year, except 1893, though it is only fractionally below that of the seasons of 1887, 1889, and 1895. As in the case of Wheat, the Eastern Counties appear on the whole to have suffered most, the maximum deficiencies in individual counties being in Bedford, Northampton, and Norfolk. Lincoln, with the largest acreage, had little better fortune, although one or two other counties had slightly larger deficiencies.

Estimated Yield of Oats.—Of the three chief cereal crops of the year, Barley was on the whole the worst and Oats the best, the estimated deficiency in the case of the latter crop being less than 1 bushel per acre. The deficiency was again greatest in the Eastern and East Midland Counties of England, and amounted to as much as 9 bushels in Middlesex, 6½ bushels in Cambridgeshire, and nearly 6 bushels in Lincolnshire. In Wales the yield was slightly over average, and in Scotland the deficiency was about ¾ of a bushel.

Estimated Yield of Potatoes.—The Potato crop was the worst of the year, the estimated yield per acre in Great Britain—4·87 tons—being as much as 17 per cent. below the ten years' average. In no previous year since the returns have been collected has so low a yield been estimated for Great Britain as a whole, the nearest year having been 1897, when the estimate was 5·17 tons. The deficiency was remarkably uniform, being 1·03 tons in England, 1·07 tons in Wales, and 1·06 tons in Scotland. There was some local variation in counties, Kent being distinguished by a crop 1¾ tons above the average, and Wiltshire by a crop ½ ton in excess. In a few Scottish counties the yield was returned as somewhat over the average, though in the great Potato-growing counties of Fife, Forfar, and Perth the yields proved to be from 22 to 33 per cent. under average.

Estimated Yield of Root Crops.—The results of the Turnip crop of 1900 were in marked contrast to those of the preceding year, particularly in England, where the yield was 13·66 tons, or 1½ tons per acre in excess of the ten years' average, while in Scotland it was ½ a ton per acre above the average. The maximum yield of the year in England was recorded in Cornwall, where the estimate was 21½ tons per acre, or 6 tons above the average for that county. This was, however, exceeded in Scotland, where the yield in Lanarkshire was estimated at 22½ tons per acre, though the increase as compared with the county average was less, being 3½ tons per acre.

The average yield per acre of Mangels was estimated for Great Britain at 20½ tons, being rather more than 3 tons above the decennial average. On only one previous occasion, in 1886, when the estimated yield was 20·84 tons, has this crop been reported as reaching the level of 20 tons per acre for the whole country. In every English county with the exception of Cambridge and Huntingdon an over-average yield was returned, the excess rising in Shropshire to as much as 5·8 tons, and in Cheshire to 5¼ tons.

Estimated Yield of Hay.—The Hay crop of Great Britain, both from permanent pasture and from clover and artificial grasses, although not comparable with the great crop of 1898, was substantially above that of 1899. The estimated yield of Hay from permanent pasture was in England 24¾ cwts. per acre, and in Wales nearly 1 ton, being in both cases about 2 cwts. above the average. In Scotland—where the area returned is relatively small—the estimated yield was 31½ cwts., or 3 cwts. over average, exceeding the return of 1898. The Western and South-Western Counties of England were the most favoured, the excess above the average being, for instance, in Westmorland as much as 8¼ cwts., in Cornwall 7½ cwts., and in Somerset 7 cwts. per acre.

The estimated yield of Clover Hay in Great Britain was 29 cwts. per acre, or 1¼ cwts. over average; but in this case also Scotland was more fortunate than either England or Wales. In England there was considerable range of difference in the results, Westmorland having as much as 11¼ cwts. in excess of its local average, while Cambridge showed 6¼ cwts. deficiency.

Crops of the United Kingdom.

The usual statement is appended in which, by the addition of the figures for Ireland to those previously referred to, the total production for the United Kingdom of the chief crops is shown, the cereals being placed in the order of their relative bulk in 1900:—

Estimated Total Produce of Crops in the United Kingdom.

Crops	1898	1899	1900
	qr.	qr.	qr.
Oats	21,572,000	20,767,000	20,642,000
Barley	9,341,000	9,317,000	8,568,000
Wheat	9,361,000	8,408,000	6,790,000
	tons	tons	tons
Potatoes	6,225,000	5,837,000	4,577,000
Turnips	26,499,000	20,370,000	28,387,000
Mangel	7,228,000	.7,604,000	9,650,000
Hay (all sorts) . . .	15,916,000	12,898,000	13,742,000

NUMBERS OF LIVE STOCK IN GREAT BRITAIN IN 1900.

Horses.—Turning now to a different side of the agricultural position in 1900, a further reduction of 16,000 in the number of horses returned as on the farms of Great Britain brings the total below that of any year since 1891. Many of the local returning officers account for some part of the decrease—which appears to have been, except in a few counties, generally experienced throughout the country—by referring to the demand for horses for military purposes and to prevailing high prices thus induced. It may be noted that the diminution is in the numbers of older horses, while the total of those under one year has been very nearly maintained.

Cattle.—The very slight increase—amounting to only 1 per 1000—in the number of cattle in the past year's returns would not attract special attention did it not obtain some significance from the fact that it covers a reduction of nearly 2 per cent. in the cows and heifers in-milk or in-calf, and of over 3 per cent. in the young stock under one year old. The increase in the "milking herd" of the country since 1894 would thus appear to have been checked, the number enumerated being 50,000 fewer than in the preceding year. The reduction appears to have been pretty generally distributed, a slight tendency in the direction of increase being visible in only a few English and Scotch counties and in Wales.

In many instances the character of the season may suffice to account for the reduction of the herd, which may thus be only temporary; but the reports of the collectors indicate the possible existence, in some localities at all events, of causes of a more permanent character, such as the difficulty of obtaining adequate labour for milking, and the substitution of grazing for dairying, to which the improved price of beef, together with temporarily lowered values for dairy produce in the early part of the year, may have contributed.

Sheep.—The reduction by 647,000, or nearly 2½ per cent., of the number of sheep in Great Britain indicates a serious loss. The lambs enumerated in June were fewer by 459,000 than in 1899, while the ewes were less by 111,000. It may nevertheless be recorded with some satisfaction that this falling-off in numbers does not seem, as has been the case in some previous years, to be connected with the prevalence of epidemic disease. Primarily

TABLE I.—**Acreage under Crops and Grass**; *and* **Number** *of* **Live** 1901 *and* 1900, *in each Division of Great Britain, with Par-*

Crops and Grass	**England**		**Wales**	
	1901	**1900**	**1901**	**1900**
	Acres	Acres	Acres	Acres
Total Area of Land and Water	32,550,698	32,550,698	4,776.779	4 776,779
Total Acreage under Crops and Grass	24,694,252	24,713,790	2,823,062	2 824,340
CORN CROPS:				
Wheat	1,617,721	1,744,556	47,019	51,654
Barley or Bere	1,635,426	1,645,022	101,907	105,048
Oats	1,831,740	1,860,513	208,773	216,447
Rye	49,649	46,102	1,460	1,464
Beans	237,361	248,828	1,215	1,288
Peas	152 185	154,295	1,596	1,542
TOTAL	5,524,082	5,699,316	361,970	377,443
GREEN CROPS:				
Potatoes	415,105	396,936	31,979	33,225
Turnips and Swedes	1,144,035	1,160,391	61,934	62,981
Mangel	386,044	401,913	9,811	9,842
Cabbage, K. Rabi and Rape	161,727	177,857	4,194	3,848
Vetches or Tares	147,186	166,718	1,344	1,545
Other Green Crops	147,136	138,562	1.217	1,049
TOTAL	2,401,233	2,442,377	110,479	112,490
Clover, Sainfoin, and Grasses under Rotation — For Hay	1,730,155	1,598,566	201,943	196,992
Not for Hay	1,132,503	1,169,472	198.325	199,690
TOTAL	2,862,658	2,768,038	400,268	396,682
Permanent Pasture or Grass, not broken up in rotation — For Hay	3,754,836	3,776,473	463,704	464,870
Not for Hay	9,702,824	9,615,404	1,477,661	1,464,175
TOTAL	13,457,660	13,391,877	1,941,365	1.929,045
Flax	662	457	6	9
Hops	51,127	51,308	—	—
Small Fruit	67,828	66,749	1,092	1,109
Bare Fallow	329,002	293,668	7,882	7.562
Live Stock	No.	No.	No.	No.
Horses used solely for Agriculture	843,624	834,063	91,876	90,955
Unbroken Horses:—one year and above	223,430	221,284	41,504	40,863
Unbroken Horses:—Under one year	94,860	93,974	21,244	21,466
TOTAL OF HORSES	1,161,914	1,152,321	154,624	153,284
Cows and Heifers in-milk or in-calf	1,887,414	1,899,623	280,890	287,014
Other Cattle:				
Two years and above	1.059,495	1,036,052	94,472	92,806
One year and under two	944,205	990,006	179,914	185,555
Under one year	900,421	923,017	187.793	193 011
TOTAL OF CATTLE	4,791,535	4,848,698	743,078	758,386
Breeding Ewes	5,845,407	6,011,818	1,364,078	1,360,245
Other Sheep:				
One year and above	3,420,482	3,454,142	845,693	874,674
Under one year	6,282.168	6,378,753	1,217,963	1,197,597
TOTAL OF SHEEP	15,548.057	15,844,713	3,427,734	3,432,516
Breeding Sows	268,909	279,782	35,446	36,130
Other Pigs	1,573,224	1,741,640	177,525	191,967
TOTAL OF PIGS	1,842,133	2,021,422	212,971	228,097

Stock (Horses, Cattle, Sheep, *and* **Pigs),** *as returned on June 4, ticulars for Ireland and Total for the United Kingdom.*

Scotland		Ireland		United Kingdom	
1901	1900	1901	1900	1901	1900
Acres	Acres	Acres	Acres	Acres	Acres
19,458.470	19,458,470	20,706,258	20,706,258	77.677.959	77.677,959
4,900,131	4,899,256	15,219,856	15,234,693	47,761,266	47,795,120
36,225	48,832	42,920	53,821	1,746,141	1,901,038
235,115	240,195	161.651	174,173	2,140,875	2,172,129
956,389	949,128	1,099,403	1,105,050	4,112,365	4,145,835
5,541	5,998	11,002	11,407	67,753	65,044
13,037	13,124	2,251	2,297	254,093	265,743
1,349	1,372	363	441	155,665	157,813
1.247,656	1,258,649	1,317,590	1,347,189	8,476,892	8,707,602
130,176	131,200	635,340	654,079	1,223,803	1,227,235
458,556	465,234	289,849	297,859	1,962,247	1,994,385
2,950	2,661	77,262	68,803	476,806	484,015
14,404	13,978	47,861	47,076	228,427	242,972
9,016	9,688	3,432	3,380	161,347	181,677
2,384	2,494	25,685	27,180	178,350	170,996
617,486	625.255	1,079,429	1,098,377	4,230,980	4 301,280
424,317	406,223	617,211	607,380	2,987,671	2,822,431
1,169,144	1,188,215	616,488	611,337	3,152,989	3,202,594
1,593,461	1,594,438	1,233,699	1,218,717	6,140,660	6,025 025
131,919	131,756	1,560,779	1,558,335	5,916,187	5,936,968
1,296,305	1,276,357	9,961,921	9,952,035	22,458,441	22,329,744
1,428,224	1,408,113	11,522,700	11,510,370	28,374,628	28,266,712
4	1	55,471	47,451	56,143	47,918
—	—	—	—	51,127	51,308
6,079	5,922	4,877	4,359	80,475	78,690
7.221	6,878	6,090	8,230	350,361	316,585
No.	No.	No.	No.	No.	No.
153,918	153,353	354,700	—	1,451,081	—
29,228	30,330	73,691	—	369,120	—
11,747	10,855	62.989	—	191,450	—
194,893	194,538	491,380	491.156	2,011,651	2,000,415
433,981	434,264	1,481,443	1,458,074	4,101,021	4,096,682
274,016	243,674	1,041,378	1 031,009	2,474,807	2,408.323
283,534	285,247	1,046.188	1,033 941	2,463,030	2,504,720
237,750	234,901	1,103,026	1,085,526	2,437,278	2,445,284
1.229,281	1,198,086	4.672,035	4,608,550	11,476,536	11,455,009
2,952,345	2,978,263	1,691,274	2,586,046	11,883,207	18,942,001
1,674,721	1,635,053	895.086		6,845,887	
2,774 343	2,701,681	1,792,285	1,800,830	12,101,190	12 112,725
7.401,409	7,314,997	4,378,645	4,386,876	30,829,784	31,054,726
15,369	16,609	130,580	—	452,050	—
109,452	115,804	1,088,466	—	2,958,990	—
124,821	132,413	1,219,046	1,268,521	3,411,040	3,663,716

no doubt, the vicissitudes of a season which bore with especial severity upon flockmasters may account for the losses under this head. The turnip crop of 1899 was described in last year's report as the worst on record, and following upon the difficulties caused by an exceptional shortness of keep came the hardships of a cold, wet, and backward spring. It was not surprising therefore that the fall of lambs was considerably below the average generally, and that the mortality of both ewes and lambs during the lambing season was greater than usual. For the first time since the returns have separately distinguished ewes, the total number of lambs in Great Britain on June 4 was less than the number of breeding ewes at that date. Among subsidiary causes contributing to the same result the higher price of mutton may be mentioned as having possibly induced earlier sales to the butcher; while there may also be some force in the observation, made by one of the collectors, that as shortness of keep prevented sheep from being fattened so heavily as usual, a larger number of them had to be sold to meet the demand for mutton.

Pigs.—The returns of Pigs in Great Britain showed that the increase noted in the figures for 1899 was more than lost in the following year, and that the position on June 4, 1900, was substantially the same as at the corresponding period in 1897.

Table III. gives the estimated yield of hops for the present year.

Tables IV. to VII. record the prices of British corn and of wool.

Table VIII. gives the annual average prices of British Corn (wheat, barley, and oats) from 1771 to the end of the century that has just closed.. This is the only Table giving the prices of the three chief British cereals for so long a period that has appeared in the Journal; but reference may be made to previous Tables of the prices of wheat, viz. 1641–1855 (Volume for 1856, p. 3); half a century (Volume for 1895, p. 207); 1842–1897 (Volume for 1898, pp. 422, 423).

Tables IX. and X. give the prices of live stock and fat cattle under the Markets and Fairs (Weighing of Cattle) Act, 1891.

Tables XI., XIII. and XIV. show the trade in live stock between Great Britain and Ireland and between the United Kingdom and foreign countries.

Table XII. and Tables XV. to XIX. present the food and other imports into the United Kingdom.

Table XX. shows the value of the exports of agricultural machinery and implements.

Table XXI. is a Preliminary Statement of the produce of Wheat, Barley and Oats in Great Britain in the year 1901.

Where not otherwise indicated, all the Tables are compiled from the Agricultural Returns issued by the Board of Agriculture.

TABLE II.—*Estimated* **Total Produce and Yield per Acre** *of the* **Principal Crops** *in England, Wales, Scotland, Great Britain, Ireland, and the United Kingdom for the years* 1900 *and* 1899.

Crops	**England**				**Wales**			
	Total Produce		Yield per acre		Total Produce		Yield per acre	
	1900	**1899**	**1900**	**1899**	**1900**	**1899**	**1900**	**1899**
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Wheat	49,528,385	62,380,067	28·39	32·83	1,332,299	1,380,938	25·79	25·62
Barley	50,977,265	56,164,313	30·99	34·34	3,341,872	3,328,494	31·81	31·41
Oats	73,604,178	73,905,288	39·56	41·48	7,238,305	7,527,952	33·44	34·18
Beans	6,928,152	7,005,116	27·88	29·90	32,643	36,519	25·34	27·29
Peas	3,995,030	4,358,876	25·94	27·31	33,391	35,330	21·65	21·22
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Potatoes	1,986,103	2,254,384	5·00	5·81	153,162	172,909	4·61	5·24
Turnips	15,855,318	9,574,450	13·66	7·95	965,943	734,495	15·34	10·99
Mangel	8,243,735	6,378,116	20·51	17·56	170,947	129,603	17·37	14·64
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt
Hops	347,894	661,373	6·78	12·76	—	—	—	—
Hay from clover, sainfoin, &c.	45,219,524	44,160,807	28·29	27·22	4,875,331	4,808,188	24·75	24·28
Hay from permanent pasture	93,400,456	87,597,660	24·73	23·34	9,254,991	8,272,251	19·91	18·09
Hay of all kinds	138,619,980	131,758,467	—	—	14,130,322	13,080,739	—	—

Crops	**Scotland**				**Great Britain**			
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Wheat	1,779,125	1,768,320	36·43	37·42	52,639,809	65,529,325	28 53	32·75
Barley	7,995,373	8,222,891	33·29	34 19	62,314,510	67,715,698	31·31	34·16
Oats	34,005,054	33,313,304	35·83	34·78	114,847,537	114,746,544	37·95	38·77
Beans	426,799	439,613	32·89	33·66	7,387,594	7,481,248	28·11	30·09
Peas	32,168	26,515	25·21	24·04	4,060,589	4,420,721	25·89	27·23
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Potatoes	595,715	649,428	4·54	5·11	2,734,980	3,076,721	4·87	5·62
Turnips	7,138,953	5,751,738	15·34	12·23	23,960,214	16,060,683	14·19	9·23
Mangel	48,808	30,120	18·34	16·87	8,463,490	6,537,839	20·42	17·48
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Hops	—	—	—	—	347,894	661,373	6·78	12·76
Hay from clover, sainfoin, &c.	13,663,763	11,904,061	33·64	30·20	63,758,618	60,873,356	28·96	27·48
Hay from permanent pasture	4,140,827	3,704,981	31·44	29·03	106,796,274	99,574,892	24·42	22·95
Hay of all kinds	17,804,590	15,609,042	—	—	170,554,892	160,448,248	—	—

Crops	**Ireland**				**United Kingdom**			
	Bush.	Bush.	Bush.	Bush.	Bush	Bush.	Bush.	Bush.
Wheat	1,682,285	1,731,244	31·26	33·38	54,822,094	67,260,569	28·61	32·76
Barley	6,231,384	6,816,708	35·78	40·17	68,545,894	74,532,406	31·67	34·64
Oats	50,289,663	51,393,296	45·51	45·26	165,137,200	166,139,840	39·97	40·57
Beans	81,405	84,836	35·44	42·63	7,468,999	7,566,084	28·18	30·19
Peas	11,082	10,177	25·13	23·95	4,071,671	4,430,898	25·89	27·22
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Potatoes	1,841,832	2,760,287	2·82	4·16	4,576,812	5,837,008	3·77	4·82
Turnips	4,426 427	4,309,053	14·86	14·29	28,386,641	20,369,736	14·29	9·97
Mangel	1,186,582	1,065,961	17·25	17·00	9,650,072	7,603,800	19·97	17·41
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Hops	—	—	—	—	347,894	661,373	6·78	12·76
Hay from clover, sainfoin, &c.	27,324,720	27,251,380	44·99	43·66	91,083,338	88,124,736	32·42	31·04
Hay from permanent pasture	76,95	70,264,520	49·38	47·01	183,750,914	169,839,412	30·98	29·11
Hay of all kinds	104,27 9,36	97,515,900	—	—	274,834,252	257,964,148	—	—

N.B.—The total produce and yield per acre of Wheat, Barley and Oats in Great Britain, in 1901 are given in Table XXI. on page 393.

TABLE III.—*Preliminary Statement showing the Estimated Total Production of* **Hops** *in the Years* 1901 *and* 1900, *with the Acreage and Estimated Average Yield per Statute Acre, in each County of England in which Hops were grown.*

COUNTIES	Estimated Total Produce		Acreage		Estimated Average Yield per Acre	
	1901	**1900**	**1901**	**1900**	**1901**	**1900**
	Cwt.	Cwt.	Acres	Acres	Cwt.	Cwt.
Gloucester	621	235	46	47	13·50	5·00
Hants	31,326	12,291	2,133	2,231	14·69	5·51
Hereford	93,988	32,680	7,497	7,287	12·54	4·48
Kent	390,429	230,028	31,242	31,514	12·50	7·30
Salop	1,296	690	144	138	9·00	5·00
Suffolk	21	7	4	4	5 25	1·75
Surrey	15,918	5,311	1,232	1,300	12 92	4·09
Sussex	65,396	39,717	4,800	4,823	13·62	8 23
Worcester	50,392	26,935	4,029	3,964	12·51	6·79
Total . . .	649,387	347,894	51,127	51,308	12·70	6·78

NOTE.—The following counties show *increased acreages*, to the extent named, in 1901:—Hereford, 210 acres; Salop, 6 acres; Worcester, 65 acres. The *decreases* are: Gloucester, 1 acre; Hants, 98 acres; Kent, 272 acres; Surrey, 68 acres; Sussex, 23 acres. The effective decrease on the year is 181 acres.

TABLE IV.—*Average Prices of* **British Corn** *per Imperial Quarter in England and Wales, as ascertained under the Corn Returns Act,* 1882, *in each Week of the Year* 1900.

Week ended	Wheat		Barley		Oats		Week ended	Wheat		Barley		Oats	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
January 6 . .	25	9	25	7	16	2	July 7 . . .	27	10	22	10	19	5
January 13 . .	25	11	25	5	16	3	July 14 . .	28	7	23	2	19	1
January 20 . .	26	0	25	8	16	2	July 21 . . .	29	0	23	8	19	3
January 27 . .	25	10	25	9	16	4	July 28 . . .	29	3	24	4	19	9
February 3 . .	25	8	25	4	16	6	August 4 . .	28	10	23	10	19	4
February 10 . .	25	10	25	3	16	5	August 11 . .	28	7	23	7	10	8
February 17 . .	26	1	24	11	16	8	August 18 . .	28	10	23	3	19	11
February 24 . .	26	3	25	1	16	9	August 25 . .	28	10	24	10	18	8
March 3 . .	26	4	24	6	16	10	September 1. .	28	8	25	2	18	1
March 10 . .	25	11	24	8	16	11	September 8. .	28	7	25	8	17	10
March 17 . .	25	10	24	6	16	11	September 15. .	28	4	25	4	17	1
March 24 . .	25	11	25	0	17	1	September 22. .	28	4	26	0	17	1
March 31 . .	25	10	24	11	17	2	September 29. .	28	9	26	1	17	2
Average of Quarter ended Lady-day.	25	11	25	1	16	7	Average of Quarter ended Michaelmas	28	7	24	5	18	7
April 7 . . .	25	10	24	10	17	2	October 6 . .	28	9	26	2	16	10
April 14 . . .	25	11	24	5	17	8	October 13 . .	28	9	26	2	17	1
April 21 . . .	26	0	24	9	17	3	October 20 . .	28	4	26	5	16	11
April 28 . . .	26	0	25	2	17	11	October 27 . .	27	11	26	3	16	11
May 5 . . .	25	11	25	3	18	0	November 3. .	27	5	26	3	16	11
May 12 . . .	25	11	24	10	17	11	November 10. .	27	3	25	11	16	10
May 19 . . .	25	7	24	5	18	5	November 17. .	27	1	25	8	17	1
May 26 . . .	25	5	23	11	18	2	November 24. .	27	2	25	10	17	0
June 2 . . .	25	5	24	4	18	6	December 1. .	27	0	25	9	17	2
June 9 . . .	25	3	23	8	18	8	December 8. .	26	10	25	11	17	4
June 16 . . .	25	6	23	8	18	11	December 15. .	26	9	25	7	17	1
June 23 . . .	25	0	23	5	18	11	December 22. .	26	7	25	7	17	2
June 30 . . .	26	11	23	4	19	3	December 29. .	26	4	25	10	17	2
Average of Quarter ended Midsummer	25	9	24	3	18	2	Average of Quarter ended Christmas	27	4	25	11	17	0

TABLE V.—*Average Prices per Imperial Quarter and Quantities of* **British Corn** *returned as sold in the Towns in England and Wales from which Returns were received under the Corn Returns Act,* 1882, *in each of the Years* 1891 *to* 1900.

Year	Wheat		Barley		Oats		Wheat	Barley	Oats
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	Qrs.	Qrs.	Qrs.
1891	37	0	28	2	20	0	3,248,743	3,255,518	561,713
1892	30	3	26	2	19	10	3,052,879	3,493,634	492,166
1893	26	4	25	7	18	9	2,620,060	3,366,056	575,522
1894	22	10	24	6	17	1	1,956,824	2,729,348	565,747
1895	23	1	21	11	14	6	1,928,383	3,426,576	665,939
1896	26	2	22	11	14	9	2,111,021	3,391,862	655,153
1897	30	2	23	6	16	11	2,756,561	3,257,187	550,434
1898	34	0	27	2	18	5	2,602,416	3,653,657	688,064
1899	25	8	25	7	17	0	3,530,961	3,296,744	776,361
1900	26	11	24	11	17	7	2,923,483	3,190,793	711,784

TABLE VI.—*Annual and Septennial Average Prices per Imperial Bushel of* **British Wheat, Barley** *and* **Oats** *in each Year from* 1891 *to* 1900 *inclusive, with the Value of* 100*l.* *of Tithe Rentcharge.*

Year	Annual Average Price						Septennial Average Price						Value of Tithe Rentcharge of 100*l.*					
	Wheat		Barley		Oats		Wheat		Barley		Oats		Calculated on Annual Average			Calculated on Septennial Average		
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
1891	4	7½	3	6¼	2	6	4	0½	3	5¼	2	3½	81	18	2½	75	18	3¼
1892	3	9¼	3	3¼	2	5¾	4	0	3	4¼	2	3¼	75	9	11¼	74	15	2¾
1893	3	3½	3	2¼	2	4	3	11	3	4	2	3¼	70	15	0½	74	3	9½
1894	2	10¼	3	0¾	2	1½	3	9	3	4	2	3½	65	1	11½	73	13	0½
1895	2	10⅓	2	8¾	1	9¾	3	7	3	2¾	2	3	58	12	0¼	71	9	6¾
1896	3	3¼	2	10¼	1	10	3	6¼	3	2	2	2¼	61	15	8¾	69	17	11½
1897	3	9¼	2	11¼	2	1¼	3	5¾	3	1	2	2	68	2	10¾	68	14	11
1898	4	3	3	4¾	2	3½	3	5¼	3	0¾	2	1¾	76	11	0½	68	2	4¾
1899	3	2½	3	2¼	2	1½	3	4¼	3	0½	2	1	67	16	7½	66	15	9¾
1900	3	4¼	3	1¼	2	2¼	3	4¼	3	0½	2	0¾	68	11	7¼	66	10	9¼

TABLE VII.—*Average Prices of* **Wool** *in each of the Years* 1894 *to* 1900.

Year	ENGLISH				AUSTRALASIAN[2]	SOUTH AFRICAN[3]
	Leicester[1]	Half-breds[1]	Southdown[1]	Lincoln[2]		
	Per lb. *d.* *d.*	Per lb. *d.* *d.*	Per lb. *d.* *s.* *d.*	Per lb. *s.* *d.*	Per lb. *d.*	Per lb. *d.*
1894	9 to 10	9½ to 10¾	9¾ to 1 0	0 10	8½	9¼
1895	9½ „ 10½	9¼ „ 11	9½ „ 0 11½	1 0	8	9¼
1896	9¾ „ 11	9¼ „ 10¾	9¼ „ 0 11¼	0 11½	8¾	7¾
1897	8¾ „ 10	8¾ „ 9¾	8¾ „ 0 10½	0 9½	8¼	7½
1898	8 „ 8¾	7¾ „ 8¾	8¼ „ 0 9¾	0 8¾	8½	7¾
1899	7 „ 8	7 „ 8¼	7¾ „ 0 11	0 8¼	9	7¾
1900	6¼ „ 7½	6¾ „ 8¾	8 „ 1 0	0 7¾	10¼	8½

[1] Computed from the prices given weekly in *The Economist* newspaper.

[2] Prices extracted from "*The Bradford Observer* Wool Tables."

[3] Prices furnished by Board of Customs, but those for 1900 have been calculated from the Trade and Navigation Accounts.

TABLE VIII.—*Average Prices per Imperial Quarter of* **British Corn** *in England and Wales in each Year from* 1771 *to* 1900, *inclusive.*

Year	Wheat		Barley		Oats		Year	Wheat		Barley		Oats	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
1771	48	7	26	5	17	2	1836	48	6	32	10	23	1
1772	52	3	26	1	16	8	1837	55	10	30	4	23	1
1773	52	7	29	2	17	8	1838	64	7	31	5	22	5
1774	54	3	29	4	18	4	1839	70	8	39	6	25	11
1775	49	10	26	9	17	0	1840	66	4	36	5	25	8
1776	39	4	20	9	15	5	1841	64	4	32	10	22	5
1777	46	11	21	1	16	1	1842	57	3	27	6	19	3
1778	43	3	23	4	13	7	1843	50	1	29	6	18	4
1779	34	8	20	1	14	5	1844	51	3	33	8	20	7
1780	36	9	17	6	13	2	1845	50	10	31	8	22	6
1781	46	0	17	8	14	1	1846	54	8	32	8	23	8
1782	49	3	23	2	15	7	1847	69	9	44	2	28	8
1783	54	3	31	3	20	5	1848	50	6	31	6	20	6
1784	50	4	28	8	18	10	1849	44	3	27	9	17	6
1785	43	1	24	9	17	8	1850	40	3	23	5	16	5
1786	40	0	25	1	18	6	1851	38	6	24	9	18	7
1787	42	5	23	4	17	2	1852	40	9	28	6	19	1
1788	46	4	22	8	16	1	1853	53	3	33	2	21	0
1789	52	9	23	6	16	6	1854	72	5	36	0	27	11
1790	54	9	26	3	19	5	1855	74	8	34	9	27	5
1791	48	7	26	10	18	1	1856	69	2	41	1	25	2
1792	43	0	27	7	16	9	1857	56	4	42	1	25	0
1793	49	3	31	1	20	6	1858	44	2	34	8	24	6
1794	52	3	31	9	21	3	1859	43	9	33	6	23	2
1795	75	2	37	5	24	5	1860	53	3	36	7	24	5
1796	78	7	35	4	21	10	1861	55	4	36	1	23	9
1797	53	9	27	2	16	3	1862	55	5	35	1	22	7
1798	51	10	29	0	19	5	1863	44	9	33	11	21	2
1799	69	0	36	2	27	6	1864	40	2	29	11	20	1
1800	113	10	59	10	39	4	1865	41	10	29	9	21	10
1801	119	6	68	6	37	0	1866	49	11	37	5	24	7
1802	69	10	33	4	20	4	1867	64	5	40	0	26	0
1803	58	10	25	4	21	6	1868	63	9	43	0	28	1
1804	62	3	31	0	24	3	1869	48	2	39	5	26	0
1805	89	9	44	6	28	4	1870	46	11	34	7	22	10
1806	79	1	38	8	27	7	1871	56	8	36	2	25	2
1807	75	4	39	4	28	4	1872	57	0	37	4	23	2
1808	81	4	43	5	33	4	1873	58	8	40	5	25	5
1809	97	4	47	0	31	5	1874	55	9	44	11	28	10
1810	106	5	48	1	28	7	1875	45	2	38	5	28	8
1811	95	3	42	3	27	7	1876	46	2	35	2	26	3
1812	126	6	66	9	44	6	1877	56	9	39	8	25	11
1813	109	9	58	6	38	6	1878	46	5	40	2	24	4
1814	74	4	37	4	25	8	1879	43	10	34	0	21	9
1815	65	7	30	3	23	7	1880	44	4	33	1	23	1
1816	78	6	33	11	27	2	1881	45	4	31	11	21	9
1817	96	11	49	4	32	5	1882	45	1	31	2	21	10
1818	86	3	53	10	32	5	1883	41	7	31	10	21	5
1819	74	6	45	9	28	2	1884	35	8	30	8	20	3
1820	67	10	33	10	24	2	1885	32	10	30	1	20	7
1821	56	1	26	0	19	6	1886	31	0	26	7	19	0
1822	44	7	21	10	18	1	1887	32	6	25	4	16	3
1823	53	4	31	6	22	11	1888	31	10	27	10	16	9
1824	63	11	36	1	24	10	1889	29	9	25	10	17	9
1825	68	6	40	0	25	8	1890	31	11	28	8	18	7
1826	58	8	34	4	26	8	1891	37	0	28	2	20	0
1827	58	6	37	7	28	2	1892	30	3	26	2	19	10
1828	60	5	32	10	22	6	1893	26	4	25	7	18	9
1829	66	3	32	6	22	9	1894	22	10	24	6	17	1
1830	64	3	32	7	24	5	1895	23	1	21	11	14	6
1831	66	4	38	0	25	4	1896	26	2	22	11	14	9
1832	58	8	33	1	20	5	1897	30	2	23	6	16	11
1833	52	11	27	6	18	5	1898	34	0	27	2	18	5
1834	46	2	29	0	20	11	1899	25	8	25	7	17	0
1835	39	4	29	11	22	0	1900	26	11	24	11	17	7

TABLE IX.—*Number of* **Cattle, Sheep,** *and* **Swine** *reported as entering the Scheduled Markets of Great Britain under the Markets and Fairs (Weighing of Cattle) Act*, 1891, *together with the Numbers Weighed and Priced.*

[*From the Journal of the Board of Agriculture, Vol. vii.*, 1901, *p.* 533.]

Animals	1898	1899	1900
CATTLE:	No.	No.	No.
Entering markets . . .	1,263,991	1,236,091	1,187,603
Weighed	138,652	139,482	141,611
Prices returned	124,197	124,552	124,648
Prices returned with quality distinguished . . .	102,299	103,613	104,318
SHEEP:			
Entering markets . . .	4,691,619	4,681,602	4,325,613
Weighed	49,953	48,643	43,581
Prices returned with quality distinguished . . .	40,460	42,154	36,312
SWINE:			
Entering markets . . .	363,370	455,056	442,216
Weighed	1,614	2,205	2,196
Prices returned with quality distinguished . . .	1,437	2,070	2,120

TABLE X.—*Average Prices of* **Fat Cattle** *per cwt. (Live Weight) for* 1899 *and* 1900. *Compiled from the Returns received under the Markets and Fairs (Weighing of Cattle) Act*, 1891.

Places	Inferior or third quality		Good or second quality		Prime or first quality	
	1899	1900	1899	1900	1899	1900
	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*
ENGLAND:						
Carlisle . .	26 10	27 6	30 8	31 2	34 6	35 2
Leicester . .	28 2	32 8	30 2	30 0	34 4	34 0
Leeds . . .	28 0	28 6	28 10	29 8	32 2	34 4
Liverpool . .	24 6	26 6	30 0	30 8	33 6	35 4
London . .	26 4	26 6	33 8	34 10	38 0	39 4
Newcastle . .	28 4	27 0	32 8	35 8	36 2	38 8
Shrewsbury . .	28 2	29 2	31 2	33 2	34 10	36 6
SCOTLAND:						
Aberdeen . .	25 4	27 4	33 2	34 8	36 10	38 2
Dundee . .	26 4	27 0	32 10	35 2	35 2	37 10
Edinburgh . .	30 0	30 8	34 6	36 4	36 6	38 4
Falkirk . .	29 4	30 8	33 2	34 10	35 2	37 8
Glasgow . .	31 8	32 8	33 0	34 0	35 4	36 10
Perth . . .	30 2	35 4	33 0	36 4	35 6	38 8

TABLE XI.—*Number of* **Live Stock (Horses, Cattle, Sheep,** *and* **Pigs) Imported** *into Great Britain* **from Ireland** *and* **Exported** *from Great Britain* **to Ireland** *in each of the Three Years,* 1898 *to* 1900.

Live Stock		Imports from Ireland			Exports to Ireland		
		1898	**1899**	**1900**	**1898**	**1899**	**1900**
HORSES:		No.	No.	No.	No.	No.	No.
Stallions		150	122	103	97	133	146
Mares		18,200	19,471	16,320	2,329	2,821	3,367
Geldings		20,454	22,494	19,183	3,367	3,641	4,213
TOTAL		38,804	42,087	35,606	5,793	6,595	7,726
CATTLE:							
Oxen, Bulls and Cows	Fat	278,770	278,064	275,450	—	—	—
	Store	460,903	442,921	427,891	384	548	139
	Others	4,101	6,219	7,442	—	—	—
Calves		59,588	45,068	34,736	37	103	23
TOTAL		803,362	772,272	745,519	421	651	162
SHEEP:							
Sheep		449,558	452,070	478,081	20,650	26,858	1,876
Lambs		383,900	419,883	384,182	3,960	12,527	35
TOTAL		833,458	871,953	862,263	24,610	39,385	1,911
PIGS:							
Fat		556,723	650,850	673,847	1	—	—
Store		32,062	37,703	41,355	125	9	5
TOTAL		588,785	688,553	715,202	126	9	5

TABLE XII.—*Quantities and Values of* **Corn** *Imported into the United Kingdom in the Years* 1898, 1899, *and* 1900.

[*From Annual Statement of Trade,* 1900.]

—	Quantities			Values		
	1898	**1899**	**1900**	**1898**	**1899**	**1900**
CORN:	Cwt.	Cwt.	Cwt.	£	£	£
Wheat	65,227,930	66,636,078	68,669,490	26,147,256	22,281,219	23,345,929
Wheat Meal and Flour	21,017,109	22,945,708	21,548,131	11,545,443	10,700,980	10,102,548
Barley	24,457,004	17,189.358	17,054,990	6,791,472	4,950,132	5,152,977
Oats	15,577,900	15,626,730	20,109,560	4,382,857	4,199,724	5,236,409
Peas	2,179,192	2,752,950	2,249,182	689,769	898,951	780,138
Beans	2,293,346	1,877,220	1,717,760	670,159	573,891	536,898
Maize	57,169,292	62,741,350	54,151,570	11,282,310	12,978,025	12,327,859
Oatmeal and Groats	989,480	789.810	837,440	615,925	505,464	523,765
Maize Meal	1,453,800	1,814,766	1,633,505	379.485	457,534	456,449
Other kinds of Corn and Meal	1,462,764	1,964,697	1,664,460	404,588	541,772	479,418
TOTAL OF CORN	191,827,817	194,338,667	189,636,088	62,909,264	58,087,692	58,042,390

TABLE XIII.—*Numbers and Values of Live* **Horses, Cattle, Sheep,** *and* **Swine** *Imported into the United Kingdom in the Years* 1898, 1899 *and* 1900.

[*From Annual Statement of Trade,* 1900, *and Agricultural Returns,* 1900.]

Imported from	Number			Value		
	1898	**1899**	**1900**	**1898**	**1899**	**1900**
HORSES:				£	£	£
Canada . .	6,359	4,792	2,976	177,600	129,988	85,158
Denmark . .	2,545	3,597	3,102	18,406	25,636	17,820
France . .	316	503	1,022	26,247	44,291	95,325
Germany . .	1,091	1,043	679	14,103	15,327	10,915
Holland . .	1,175	1,112	1,028	40,402	40,542	38,365
Russia . .	5,413	7,198	11,779	54,544	73,067	116,956
United States .	25,328	25,169	30,380	779,059	791,410	952,956
Other countries	694	485	820	35,963	22,829	32,998
TOTAL .	42,921	43,899	51,786	1,146,324	1,143,090	1,350,493
CATTLE:						
Channel Islands	1,814	1,732	1,826	34,785	33,101	33,845
Canada . .	108,405	94,660	104,839	1,774,760	1,596,097	1,806,238
United States .	369,478	321,229	350,209	6,238,984	5,541,781	6,500,744
Argentina .	89,369	85,365	38,562	1,351,264	1,392,599	667,500
Uruguay . .	—	518	209	—	8,536	3,867
TOTAL .	569,066	503,504	495,645	9,399,793	8,572,114	9,012,194
SHEEP & LAMBS:						
Canada . .	42,070	63,930	35,673	63,286	100,320	56,255
Falkland Islands	12,193	—	—	17,014	—	—
United States .	147,021	121,030	142,906	219,706	184,446	224,843
Argentina .	430,073	382,080	178,969	637,388	598,436	289,000
Chile . .	4,304	13,602	—	5,830	19,819	—
Iceland . .	28,086	22,650	24,217	41,639	32,967	38,425
Uruguay . .	—	4,463	1,068	—	6,903	1,602
TOTAL .	663,747	607,755	382,833	984,863	942,891	610,125
SWINE:						
United States .	450	—	—	1,020	—	—
TOTAL VALUE OF LIVING ANIMALS FOR FOOD	—	—	—	10,385,676	9,515,005	9,622,319

TABLE XIV.—*Numbers and Values of Live* **Horses, Cattle, Sheep,** *and* **Swine** *Exported from the United Kingdom in the Years* 1898, 1899, *and* 1900.

[*From Annual Statement of Trade,* 1900.]

Exported to	Number			Value		
	1898	**1899**	**1900**	**1898**	**1899**	**1900**
HORSES:				£	£	£
Canada . .	121	158	158	5,115	12,072	16,608
United States .	115	185	439	13,503	18,520	39,226
Belgium . .	20,911	18,229	16,604	289,739	250,084	238,505
France . .	4,961	5,075	2,949	308,104	281,338	197,855
Germany . .	2,203	2,060	1,462	81,378	63,477	47,603
Holland . .	7,324	7,007	7,568	67,887	64,017	80,096
Russia . .	47	123	71	25,248	9,154	6,510
Other countries	730	864	787	51,132	58,417	55,524
TOTAL .	36,412	33,701	30,038	842,106	757,079	681,927
CATTLE:						
Channel Islands	1,361	1,095	582	24,141	18,769	9,514
Canada . .	140	253	572	3,209	6,600	17,169
United States .	342	345	429	10,145	11,927	20,395
Argentina .	511	786	480	39,809	65,096	42,771
Other countries	507	500	679	17,110	15,902	28,488
TOTAL . .	2,861	2,979	2,742	94,414	118,294	118,337
SHEEP & LAMBS:						
Australasia .	87	99	88	1,716	3,462	2,206
Canada . .	317	704	703	1,531	2,693	3,706
United States .	163	620	220	1,780	3,525	1,302
Argentina .	6,632	3,904	1,991	94,323	53,313	31,534
Germany . .	1,067	773	592	7,817	6,667	5,299
Other countries	1,958	1,486	1,340	13,143	8,143	9,259
TOTAL .	10,224	7,586	4,934	120,310	78,103	53,306
PIGS:						
British possessions . .	103	48	56	978	454	443
Foreign countries . .	331	890	379	2,253	4,827	2,589
TOTAL .	434	938	435	3,231	5,281	3,032

TABLE XV.—*Quantities of* Wheat, *and of* Wheat Meal *and* Flour, *Imported into the United Kingdom in each of the Four Years,* 1897 *to* 1900; *also the Countries from which they were obtained.*

[*From Annual Statement of Trade,* 1900.]

—	1897	1898	1899	1900
WHEAT *from*—	Cwt.	Cwt.	Cwt.	Cwt.
Russia	15,049,900	6,232,500	2,518,200	4,478,300
Germany	1,333,400	711,390	466,030	1,828,300
Turkey	1,862,540	271,560	27,300	131,200
Roumania	1,221,340	183,700	32,100	756,100
United States	34,603,200	37,855,200	34,650,648	32,588,470
Chile	1,019,300	807,300	265,300	2,500
Argentina	933,100	3,983,400	11,368,600	18,524,000
Brit. E. Indies	572,760	9,537,900	8,192,200	6,100
Australasia	—	211,620	3,703,030	3,788,200
Canada	4,820,500	5,012,030	5,256,500	6,337,600
Other countries	1,324,140	421,330	156,170	228,720
TOTAL WHEAT	62,740,180	65,227,930	66,636,078	68,669,490
WHEAT MEAL AND FLOUR *from*—	Cwt.	Cwt.	Cwt.	Cwt.
Germany	73,745	107,340	60,707	36,154
France	1,682,420	438,160	641,838	755,848
Austrian Territories	1,143,950	729,290	1,029,616	1,167,955
United States	14,062,970	17,445,890	18,405,796	17,877,308
Canada	1,530,690	1,968,200	2,498,920	1,195,219
Other countries	186,894	328,229	308,831	515,647
TOTAL WHEAT MEAL AND FLOUR	18,680,669	21,017,109	22,945,708	21,548,131

TABLE XVI.—*Quantities and Values of* Fruit, Vegetables, *and* Hops *Imported into the United Kingdom in the Years* 1898, 1899, *and* 1900.

[*From Annual Statement of Trade,* 1900.]

—	Quantity[1]			Value		
	1898	1899	1900	1898	1899	1900
	Bushels	Bushels	Cwt.	£	£	£
Apples	3,458,716	3,861,172	2,128,541	1,108,056	1,186,143	1,224,657
Strawberries	—	—	52,225	—	—	85,949
Cherries	401,810	281,236	242,525	230,828	153,642	308,363
Plums	922,248	558,273	423,019	434,666	294,052	392,696
Pears	491,669	571,832	476,901	221,779	266,351	366,860
Grapes	1,135,759	1,157,647	592,857	549,513	588,467	595,000
Oranges	7,274,312	8,553,713	5,090,386	1,986,960	2,182,233	2,120,790
Lemons, etc.	1,631,644	1,688,503	947,891	439,285	453,238	420,857
Unenum'd (Raw)	2,177,132	2,247,785	494,722	870,711	924,823	289,750
			Bushels			
Onions	6,002,515	7,018,299	7,087,105	792,909	845,752	852,496
	Cwt.	Cwt.	Cwt.			
Potatoes	6,751,728	5,159,011	8,910,962	1,913,912	1,577,726	2,234,569
Vegetables, Raw, unenumerated	—	—	—	1,680,786	1,744,558	766,394
Hops	244,136	180,233	198,494	1,030,140	809,842	795,479

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[1] The denomination of the fruits was altered in 1900 from "Bushels" to "Cwt."

TABLE XVII.—*Quantities and Values of* **Dead Meat** *Imported into the United Kingdom in the Three Years,* 1898 *to* 1900.

[*From Annual Statement of Trade,* 1900.]

DEAD MEAT		1898		1899		1900	
		Quantity	Value	Quantity	Value	Quantity	Value
		Cwt.	£	Cwt.	£	Cwt.	£
BACON:	From United States	4,087,389	6,438,239	4,088,546	6,552,180	3,956,527	7,491,943
	„ Denmark	1.017,520	2,701,112	1,210,612	2,945,757	1,094,626	3,058,782
	„ Canada	535,879	995,625	453,773	761,861	529,864	1,075,445
	„ Other countries	70,534	186,698	51,652	139,804	60,221	147,799
	Total	5,711,322	10,321,674	5,804,583	10,399,602	5,641,238	11,773,969
BEEF: Salted	From United States	203,645	266,660	175,056	226,842	185,329	244,821
	„ Other countries	5,300	6,344	3,127	4,101	7,605	11,597
	Total	208,945	273,004	178,183	230,943	192,934	256,418
Fresh	From United States	2,301,956	4,677,431	2,756,458	5,711,525	2,867,238	6,059,776
	„ Australasia	624,407	953,338	743,643	1,124,912	724,658	1,168,268
	„ Other countries	174,458	284,936	302,791	508,827	536,234	934,804
	Total	3,100,821	5,915,705	3,802,892	7,345,264	4,128,180	8,162,848
HAMS:	From United States	1,851,520	3,651,414	1,823,965	3,781,007	1,602,453	3,762,714
	„ Canada	117,428	233,272	150,698	301,212	196,182	446,942
	„ Other countries	3,351	10,153	3,963	12,281	4,035	12,153
	Total	1,972,299	3,894,839	1,978,626	4,094,500	1,802,670	4,221,809
MEAT (Unenumerated): Salted or Fresh	From Holland	249,939	517,507	254,001	526,271	266,412	564,863
	„ United States	90,412	156.706	123,423	214,283	140,473	231,342
	„ Other countries	74,626	138,525	87,335	142,795	123,803	185,964
	Total	414,977	812,738	464,759	883,349	530,688	982,169
Preserved, otherwise than by Salting	Beef	281,344	1,017,480	366,349	1,063,636	518,029	1,457,322
	Mutton	118,314	195,249	87,295	156,004	64,462	150,973
	Other sorts.	175,279	589,711	198,777	676,076	223,452	775,643
	Total	574,937	1,802,440	652,421	1,895,716	805,943	2,383,938
MUTTON: Fresh	From Australasia	1,934,108	2,940,698	2,001,452	3,274,976	1,933,246	3,380,241
	„ Argentina	1,106,201	1,357,926	1,141,208	1,490,076	1,114,795	1,689,078
	„ Holland	265,543	584,779	284,886	629,040	331,320	737,529
	„ Other countries	8,149	18,776	18,476	45,225	13,489	34,718
	Total	3,314,001	4,902,179	3,446,022	5,439,317	3,392,850	5,841,566
PORK: Salted (not Hams)	From United States	175,000	224,534	164,042	199,850	128,402	177,671
	„ Other countries	100,993	95,244	120,678	105,979	120,326	123,678
	Total	275,993	319,778	284,720	305,829	248,728	301,349
Fresh	From Holland	222,672	474,462	344,346	727,637	389,184	823,826
	„ Belgium	35,102	88,258	35,342	91,996	51,527	127,008
	„ United States	276,829	556,269	276,844	553,356	238,179	502,618
	„ Other countries	22,999	46,391	12,440	30,052	16,505	41,941
	Total	557,602	1,165,380	668,072	1,403,041	695,395	1,495,393
RABBITS:	From Australasia	204,933	275,235	266,543	342,121	387,185	494,050
	„ Belgium	84,505	228,876	80,983	216,658	58,874	161,155
	„ Other countries	24,960	68,492	29,785	79,876	27,103	75,227
	Total	314,398	572,603	377,311	638,655	473,162	780,432
TOTAL OF DEAD MEAT		16,445,295	29,980,340	17,658,489	32 636,216	17,911,738	36,149,891

TABLE XVIII.—*Quantities and Values of* **Butter, Margarine, Cheese, Milk, Poultry,** *and* **Eggs** *Imported into the United Kingdom in each of the Years* 1898, 1899, *and* 1900; *also Countries from which they were obtained.*

[*From Annual Statement of Trade*, 1900.]

—	Quantities			Values		
	1898	**1899**	**1900**	**1898**	**1899**	**1900**
BUTTER:	Cwt.	Cwt.	Cwt.	£	£	£
From Sweden . .	294,962	245,599	196,041	1,501,668	1,246,137	1,013,775
„ Denmark . .	1,465,030	1,430,052	1,486,342	7,359,831	7,553,436	8,029,625
„ Germany . .	41,231	36,953	36,042	214,046	186,573	190,820
„ Holland . .	269,324	284,810	282,805	1,329,438	1,417,641	1,414,441
„ France . .	416,821	353,942	322,048	2,183,845	1,908,848	1,785,504
„ New South Wales	34,391	43,561	81,436	167,618	215,274	394,415
„ Victoria . .	124,223	211,744	264,603	605,611	1,051,358	1,296,438
„ New Zealand .	69,949	111,639	163,871	338,400	543,367	784,054
„ Canada . .	156,865	250,083	138,313	661,935	1,113,956	640,760
„ United States .	66,712	159,137	56,046	285,309	704,061	247,724
„ Other countries .	269,645	262,331	350,969	1,314,082	1,272,865	1,652,879
Total . .	3,209,153	3,389,851	3,378,516	15,961,783	17,213,516	17,450,435
MARGARINE:						
From Norway . .	8,477	8,278	8,430	22,799	22,654	23,100
„ Holland . .	844,177	897,806	862,154	2,209,809	2,379,044	2,295,174
„ France . .	30,299	29,675	26,587	105,309	103,069	91,189
„ Other countries .	17,662	17,416	23,241	46,467	44,709	55,362
Total . .	900,615	953,175	920,412	2,384,384	2,549,476	2,464,825
CHEESE:						
From Holland . .	292,925	328,541	327,382	724,936	810,015	799,632
„ France . .	33,086	34,307	35,110	94,102	103,159	108,065
„ Australasia .	44,608	32,294	81,003	91,161	72,318	218,376
„ Canada . .	1,432,181	1,337,198	1,511,872	2,943,725	3,014,211	3,799,223
„ United States .	485,995	590,737	680,583	1,006,586	1,380,609	1,740,749
„ Other countries .	50,657	60,992	69,928	109,732	122,692	171,838
Total . .	2,339,452	2,384,069	2,705,878	4,970,242	5,503,004	6,837,883
MILK (Condensed)	817,274	824,599	987,003	1,435,951	1,455,033	1,743,675
MILK AND CREAM (other than Condensed)	10,691	7,859	15,638	11,293	16,068	26,837
Total . .	827,965	832,458	1,002.641	1,447,244	1,471,101	1,770,512
POULTRY (and Game):						
From Russia . .	—	—	—	164,498	139,834	199,282
„ Belgium . .	—	—	—	127,923	165,803	213,603
„ France . .	—	—	—	217,703	296,555	333,190
„ Other countries .	—	—	—	127,368	183,102	264,294
Total . .	—	—	—	637,492	785,294	1,010,369
EGGS:	Great Hundreds	Great Hundreds	Great Hundreds			
From Russia . .	3,645,903	4,318,601	4,024,712	966,129	1,183,031	1,109,553
„ Denmark . .	2,019,508	2,266,030	2,438,858	685,447	808,543	923,551
„ Germany . .	2,821,128	3,454,986	3,513,988	788,844	966,641	1,017,119
„ Belgium . .	2,349,962	2,457,558	2,375,983	730,898	759,256	733,453
„ France . .	2,115,096	2,288,558	2,276,850	817,336	867,875	867,532
„ Canada . .	745,355	646,867	807,702	251,710	233,693	288,945
„ Other countries .	727,649	742,156	1,443,985	216,753	225,369	465,867
Total . .	14,424,601	16,174,756	16,882,078	4,457,117	5,044,402	5,406,020

TABLE XIX.—*Quantities and Values of* **Wool, Wood, Seeds, Manures,** *&c., Imported into the United Kingdom in the Years* 1898, 1899, *and* 1900.

[*From Annual Statement of Trade*, 1900.]

—	Quantity			Value		
	1898	**1899**	**1900**	**1898**	**1899**	**1900**
WOOL: Sheep and Lambs' .	Lb. 694,701,454	Lb. 663,351,817	Lb. 553,154,732	£ 23,586,901	£ 23,714,771	£ 21,836,291
WOOD AND TIMBER:						
Hewn . .	Loads 2,331,755	Loads 2,664,877	Loads 3,121,148	4,890,639	5,319,375	6,462,725
Sawn or Split, Planed or Dressed .	6,363,357	6,639,548	6,632,710	15,056,040	16,209,551	18,686 359
Staves . .	139,120	126,216	145,279	646,075	659,312	721,850
SEEDS:						
Clover & Grass	Cwt. 342,773	Cwt. 299,268	Cwt. 261,957	655,211	549,743	508,913
Cotton . .	Tons 430,432	Tons 358,012	Tons 406,478	2,069,111	2,036,550	2,624,450
Flax or Linseed . .	Qrs. 1,688,515	Qrs. 1,798,887	Qrs. 1,666,031	2,920,634	3,383,962	4,162,146
Rape . .	258,951	207,648	134 243	367,736	307,053	246,620
MANURES:						
Bones (burnt or not) . .	Tons 59,406	Tons 68,915	Tons 68,137	245,639	313,659	301,803
Guano .	23,644	26,911	33,636	117,924	140,075	177,409
Nitrate of Soda . .	130,327	140,851	141,155	972,801	1,069,771	1,155,462
Phosphate of Lime & Rock	330,610	420,108	355,502	502,422	682,940	588,698
MISCELLANEOUS:						
Cotton, Raw .	Cwt. 19,004,896	Cwt. 14,520,062	Cwt. 15,716,131	34,125,554	27,672,399	40,982,594
Hay . .	Tons 116,107	Tons 131,546	Tons 109,698	396,032	429,799	397,585
Straw . .	71,966	64,827	55,835	162,367	145,112	127,582
Flax . .	97,253	99,052	71,586	2,932,646	2,927,864	2,511,810
Hemp . .	94,442	91,973	105,227	2,308,480	2,664,647	3,345,761
Linen Yarn .	Lb. 15,738,320	Lb. 25,558,113	Lb. 25,479,150	599,346	1,011,961	915,441
Hides, Raw:						
Dry . .	Cwt. 543,212	Cwt. 446,725	Cwt. 747,747	1,454,935	1,148,189	1,950,389
Wet . .	694,154	763,548	636,204	1,451,029	1,639,898	1,467,755
Leather . .	1,248,673	1,354,186	1,408,921	7,788,261	8,582,379	8,792,952
Petroleum .	Gallons 219,249,539	Gallons 240,147,367	Gallons 254,978,043	3,733,632	4,574,989	5,559,259
Lard . .	Cwt. 2,106,871	Cwt. 2,188,049	Cwt. 1,927,274	2,887,801	3,068,975	3,266,582
Oil-seed Cake .	Tons 390,753	Tons 441,934	Tons 394,890	2,284,244	2,649,184	2,547,541

TABLE XX.—*Value of* **Agricultural Machinery** *and* **Implements** *Exported from the United Kingdom in each of the Five Years* 1896 *to* 1900. [*From Annual Statement of Trade*, 1900.]

Agricultural	1896	1897	1898	1899	1900
STEAM ENGINES:	£	£	£	£	£
To British Possessions .	64,446	55,317	64,909	62,940	59,380
„ Foreign Countries .	476,991	467,923	623,025	698,589	696,125
Total . . .	541,437	523,240	687,934	761,529	755,505
MACHINERY NOT STEAM:					
To British Possessions .	93,067	113,442	137,693	113,889	106,550
„ Foreign Countries .	570,718	548,846	712,543	831,130	766,086
Total . . .	663,785	662,288	850,236	945,019	872,636
IMPLEMENTS AND TOOLS:					
To British Possessions .	171,541	183,572	173,324	164 949	158,895
„ Foreign Countries .	261,270	214,414	218,752	244,096	225,149
Total . . .	432,811	397,986	392,076	409,045	384,044
Total of Agricultural Machinery and Implements . . .	1,638,033	1,583,514	1,930,246	2,115,593	2,012,185

TABLE XXI.—*Preliminary Statement showing the Estimated Total Produce and Yield per Acre of* **Wheat, Barley,** *and* **Oats** *in Great Britain in the Year* 1901, *with Comparative Statements for the Year* 1900, *and for the Average of the Ten Years* 1891–1900.

—	Estimated Total Produce		Acreage		Estimated Yield per Acre		Average of the Ten Years '91–1900
	1901	1900	1901	1900	1901	1900	
WHEAT.							
	Bushels	Bushels	Acres	Acres	Bushels	Bushels	Bushels
England .	49,882,667	49,528,385	1,617,721	1,744,556	30·84	28·39	29·91
Wales . .	1,156,673	1,332,299	46,882	51,654	24·67	25·79	24·24
Scotland .	1,418,262	1,779,125	36,225	48,832	39·15	36·43	37·08
Great Britain	52,457,602	52,639,809	1,700,828	1,845,042	30·84	28·53	29·93
BARLEY.							
England .	49,557,593	50,977,265	1,635,426	1,645,022	30·30	30·99	33·03
Wales . .	3,016,334	3,341,872	101.907	105,048	29·60	31·81	30·26
Scotland .	8,533,696	7,995,373	235,115	240,195	36·30	33·29	35·79
Great Britain	61,107,623	62,314,510	1,972,448	1,990,265	30·98	31·31	33·13
OATS.							
England .	67,863,053	73,604,178	1,831,740	1,860,513	37·05	39·56	40·38
Wales . .	6,490,336	7,238,305	208,773	216,447	31·09	33·44	33·18
Scotland .	35,752,141	34,005,054	956,389	949,128	37·38	35·83	36·19
Great Britain	110,105,530	114,847,537	2,996,902	3,026,088	36·74	37·95	38·47

THE WEATHER DURING THE AGRICULTURAL YEAR, 1900–1901.

DURING the past agricultural year the weather, in its varying moods, proved a source of more than ordinary anxiety to the farmer. The autumn of 1900 was, upon the whole, favourable, the weather being mild and sufficiently dry to permit of the almost uninterrupted progress of sowing and of other farm operations.

The winter opened with a phenomenally warm December, with copious falls of rain, especially in the western and southern districts. With the turn of the new year, however, winter began to put in a belated appearance, and in the season of 1900–1901, as on several other recent occasions, the truth of the old saying, "As the days lengthen, the cold strengthens," was abundantly verified, February and March being marked by long spells of low temperatures and occasional severe frosts. Snow and sleet were also very frequent, while in March there were some rather heavy falls of rain.

During the spring the farmer's anxieties began in earnest, the latter part of the season being very dry, especially in the eastern and southern districts, where the growth of pastures was terribly slow. Not much improvement took place early in the summer, and as a result the hay harvest proved lamentably deficient, the crop being, in some places, so small as to be hardly worth the trouble of cutting. A little later on, towards the middle of June, the rain, which would have been so invaluable had it come a little earlier, became more copious, and as the weather turned cool apprehensions were diverted from the hay to the condition of the grain crops, which began to present a stunted and sickly appearance.

In this respect, however, the agriculturist soon witnessed a change very similar in character to that which occurred in 1900. Towards the end of June a hot and mainly dry spell set in, and in a very short time the cereals began to make rapid progress, the result being that the wheat harvest commenced (in the southern districts at all events) at an unusually early date, the yield and quality of the grain being also better than at one time seemed probable. Very heavy rains fell in most districts at the end of July, but August was, upon the whole, a dry month, excepting in the west and north, where precipitation was frequent, and in some cases rather heavy.

THE WINTER OF 1900–1901.

The weather in December was influenced by an almost constant stream of cyclonic disturbances which reached our shores from the Atlantic. The storm centres moved, as a rule, along our extreme north-western and northern coasts, and as a result the winds were mainly from south-west and west, usually strong in force, and blowing a severe gale on the 21st, and again on the 28th. Rain was frequent and often very heavy, especially in the western and southern districts. The month was, upon the whole, the mildest and the wettest December experienced in this country for at least thirty years past, with the single exception of that of 1898, when the weather in December was strikingly similar to that observed in 1900.

Soon after the beginning of the new year a cold easterly wind spread over us from the Continent, and at the beginning of the second week in January a severe frost occurred in most places. The remainder of the month was very changeable, and in the latter half of the time cyclonic systems moving along our north-western and northern coasts occasioned another spell of mild south-westerly and westerly winds, the rainfall being, however, far lighter than might have been expected with such conditions. On January 27 a severe gale from west and north-west swept over the whole kingdom, the shift of wind to the latter quarter being accompanied by colder weather, and by snow in nearly all districts.

In February the winds were mainly from the northward; the weather was, therefore, cold and cloudy, with frequent snow-showers, the latter being at times heavy in the northern and eastern districts. Sharp frost occurred on many occasions, the most severe being registered about the middle of the month, when the thermometer fell below 15° in some parts of our eastern counties. Towards the close of the month and of the season, mild and humid winds from west and south-west again set in, and heavy rain fell in all the western districts.

Winter Temperature.—Throughout the month of December 1900, the mean temperature was considerably above the average, the excess of warmth being especially large in the second week. The earlier half of January was much cooler, and in the week ending the 12th the thermometer was below the average. After this the weather again became very mild for the time of year, the mean temperature being above the normal until very nearly the end of the month. A long period of cold now set in, and lasted until about the end of the third week in February, the cold being greatest in the second week. At the close of February the weather again turned mild, the excess of warmth being, however, far from great. Owing to the great predominance of mild weather the mean temperature of the winter was well above the average in all but the south-western parts of England, where the excess was trifling. The highest temperatures of the season occurred at various times in December, the shade readings being above 55° on many occasions.

The lowest temperatures of last winter occurred either on January 9, between February 4 and 7, or on February 14. On the first and last of these occasions the sheltered thermometer fell below 20° in many places, the lowest reading of all being at Swarraton, in Hampshire, where the thermometer on January 9 sank a couple of degrees below zero. Next to this the lowest reading appears to have been at Geldeston, near Beccles, where the thermometer on February 14 fell to 10°.

Winter Rainfall.—In the earlier part of the winter there was a general excess of rain, the wettest time being at the end of December and the beginning of January. For the remainder of the season the rainfall was very deficient, the only time with any general excess being the closing week of the winter—that ending with March 2. In all parts of the country the number of days with rain was greater than that shown by the normals for the fifteen years 1881–95. A comparison with previous years shows that the winter was much drier than its two immediate predecessors, but that in all but the north-western parts of the country it was not so dry as the season of 1897–98. Throughout last winter heavy individual falls of rain were somewhat rare. On December 4 and 5 a considerable downpour occurred over all the south-western parts of the country, more than an inch falling at Jersey, nearly an inch and a-half at Falmouth on the 4th, and nearly an inch and a-quarter at Arlington Court (North Devon) on the 5th. The heaviest rainfall of the whole winter occurred, however, on December 30, when more than two inches were registered in many parts of our western and south midland counties, and more than three inches in a narrow strip of country extending north-eastwards from Bristol and Chepstow to Coventry. At Stratford-on-Avon the amount was as much as 3·6 inches, while at Coventry there was as much as 3·9 inches. The tremendous downpour occasioned serious floods in many places and in conjunction with a heavy north-westerly gale led to the overthrow of one of the huge trilithons at Stonehenge.

Bright Sunshine in Winter.—Cloudy weather prevailed throughout the greater part of the season, the only weeks in which anything like a general excess of sunshine was reported being the third in December, the first and last in January, and the second in February. The total duration of sunshine for the winter was consequently below the normal, the deficiency being greatest in the north-eastern counties, but rather large also in the midland and south-western districts. In the north-eastern parts of the country the mean amount per day was only a little more than an hour, as against an average of nearly an hour and a-half. Over England generally the duration of sunshine was less than in many recent winters, and in the north-east it was the smallest recorded for at least eight years past. In the eastern and southern districts, however, it was somewhat larger than in the preceding winter—that of 1899–1900.

THE SPRING OF 1901.

The earlier half of the season was mostly cloudy and cool, especially in March, when a decided current of wind from the eastward and north-eastward brought with it an instalment of the cold which still prevailed over northern and central Europe. In the latter part of the month snow fell at frequent intervals, while frost was general, the temperatures registered between the 26th and 29th being unusually low for so advanced a period in the season. At the beginning of April the weather turned milder, but for about a fortnight it was extremely wet, the rainfall in that period being in many places in excess of the average for the whole month.

After the middle of April a radical change took place, and for the remainder of the spring the weather was mostly fine, warm, and very dry, the only exception occurring during the second week in May, when cool wet weather prevailed in most districts. In many parts of our eastern, midland, and southern counties scarcely a drop of rain fell in April after the 16th, and in the fortnight commencing about May 12 an absolute drought prevailed over nearly the whole of the United Kingdom. Throughout the season there was a decided tendency for thunderstorms, especially in the eastern and southern parts of the country, and in some cases these were accompanied locally by heavy falls of rain.

Spring Temperature.—At the beginning of March the temperature was above the average, but after the close of the first week the weather turned gradually colder, and by the end of the month it had become unusually wintry for the time of year. Throughout April and the earlier half of May the difference from the normal was never very great, the general tendency being, however, for an excess of warmth. In the latter half of May, and especially in the closing week, the thermometer was well above the average. Taking the season as a whole, the mean temperature agreed closely with the normal in the eastern counties, and was slightly in defect in the south. In all other districts it was above the average, the excess being mostly small, but rather large in the north-east. The highest temperatures of the season occurred at the close of May (mostly on the 29th), when the thermometer in the shade rose a little above 75° in the western and northern districts, and above 80° in the eastern, midland, and southern counties, the highest reading reported being 85° at Cambridge. In most places these were the highest spring temperatures recorded since the year 1895. Unusually warm weather for the time of year was also experienced towards the close of April, the thermometer on the 22nd or 23rd exceeding 75° in many places, and reaching 79° at Bawtry (north Notts) and Cambridge. The lowest temperatures of the spring were recorded at the end of March (chiefly on the 29th), when the thermometer fell to very nearly 20° in the north-eastern and eastern counties, and below 20° in most other districts, the lowest reading reported being 17° at Llandovery (Carmarthenshire).

Spring Rainfall.—This was slightly in excess of the average in the first week of March and considerably in excess in the last week of that month and the earlier half of April. At nearly all other times there was a deficiency, the driest weather being experienced in the third and fourth weeks of May, when scarcely any rain fell in any part of the kingdom. Taking the spring as a whole, the rainfall was less than the average in all districts excepting the eastern, where the normal was just reached, and the Channel Islands, where there was an excess amounting to as much as 27 per cent. In the southern parts of England the deficiency was very small; but in the north it was much larger, the total fall in the north-eastern and north-western districts amounting to only 87 per cent. of the average. Over the country generally the spring was much wetter than in 1900, and in the south of England it was also wetter than in 1899. As a rule, however, the seasons of 1897, 1898, and 1899 were all wetter than that of 1901, while those of 1895 and 1896 were much drier.

Bright Sunshine in Spring.—In the earlier half of the season the weather was mostly cloudy, the only week with any general excess of sunshine being the last in March. On several other occasions, however, the northern parts of the kingdom received more than their due share. The latter half of the spring was more highly favoured, a large and general excess being reported in four weeks out of seven. The week ending May 25 was unusually sunny, as much as 93 per cent. of the possible duration being recorded in the Channel Islands, and 89 per cent. in the eastern and south-western counties. Taking the season as a whole, the amount of bright sunshine was considerably in excess of the average in all districts excepting the Channel Islands, the duration being especially large in the northern parts of the country. In the north-eastern counties the average daily amount of sunshine in the spring is nearly 4¾ hours; last spring it was more than 5¾ hours. In the north-western counties the average daily allowance is nearly 5 hours; last spring it was nearly 6½ hours. Over the country generally the spring was by far the sunniest experienced for at least seven years past, but in the Channel Islands the record was not so good as in the three successive seasons 1894 to 1896.

THE SUMMER OF 1901.

The summer of 1901 consisted of long runs of fine warm and dry weather, interrupted at intervals by short spells of excessive rains, the latter being attended in most instances by thunderstorms, often of considerable severity. Throughout the season the weather seems to have possessed a strange recuperative power, so that while there were, as we have seen, many occasions on which it appeared to have broken up entirely, the fine warm tendency soon reasserted itself and heavy rains gave place to summer sunshine, and in some cases to actual drought.

The summer opened with a rather changeable June, the temperature being usually below the average, with frequent rains in the middle portion of the month. Towards the end of June a decided improvement took place, and for about a month the weather was for the most part hot, dry, and forcing, with, however, occasional thunderstorms in most parts of the country. The closing week of July was marked by heavy falls of rain, but in August an improvement again took place; and although the conditions were not altogether settled, there was throughout the month a decided preponderance of fine seasonable weather.

Summer Temperature.—A week of warm weather at the beginning of June was succeeded by a fortnight in which the mean temperature was below the average. With the commencement of July a long spell of warmth set in, no general deficiency of heat being experienced until the last week in August. The summer was therefore, upon the whole, a very warm one, the mean temperature of the entire season being above the average in all districts, and especially so in the north-eastern, midland, and south-western counties. Over the country generally the season was strikingly similar to its immediate predecessor, that of 1900, and also to that of 1897. It was, however, appreciably cooler than that of 1899. The highest temperatures of the summer occurred about the middle of July, mostly between the 18th and 20th, when the thermometer in the shade rose to 90°, or slightly above it, in many parts of the country, the highest reading reported being 92° at Newton Reigny (near Penrith), Bawtry, and Colly Weston (near Stamford). During the latter part of July and the early part of August, however, the thermometer again exceded 85° in several places, and on August 9 it reached a maximum of 91° at Hillington in Norfolk. In comparison with some recent years, the extreme heat of July was not remarkable, the summer being the third consecutive one, and the fourth out of five, in which temperatures of 90° and upwards were registered over England. So long a sequence of warmth is without parallel in records extending back rather more than thirty years. The lowest temperatures of the summer occurred about the middle of June, mostly on the 18th or 19th, when the sheltered thermometer in many places fell perilously near the freezing-point ; on the surface of the ground slight frost occurred at several inland stations. Equally low readings were observed in the summer of 1899, and also in that of 1895, the cold weather occurring in each case at about the same time in the season. In the other summers of the past seven years the thermometer never fell so low as it did this year.

Summer Rainfall was mostly deficient, the only weeks with any general excess being the third in June, the fourth in July, and the second and last in August. The driest time occurred about the middle of July, when an absolute drought of about a fortnight's duration occurred in some parts of our midland, southern, and south-western counties. The wettest time occurred in the fourth week of July, when heavy thunder-rains were experienced in nearly all districts. From what has been said it will be readily seen that the summer was upon the whole a dry one, the deficiency of rain being large in all but the midland counties. In the north-west the total rainfall was little more than three-fourths of the average, while in the Channel Islands it was less than three-fourths. The driest weather of all occurred, however, in the eastern counties, the total rainfall there being only 60 per cent. of the average. At Yarmouth the fall was less than in any summer of the past thirty years with the single exception of 1885, when the total amounted to little more than two inches ; this year it was rather more than three inches. In other districts the summer was not so dry as in 1898 or 1899, and in the south of England it was not so dry as in 1896. The number of days with rain was considerably less than the average, but not so small as in 1899. In a summer eminently distinguished by thundery weather, heavy individual falls of rain were naturally very frequent.

Bright Sunshine in Summer.—The amount of bright sunshine was usually in excess of the average, the only weeks with any general deficit being the third in June, the first and last in July, and the second in August. The sunniest week of all was that ending August 24, when more than 80 per cent. of the possible amount was registered in all the western and southern districts, and as much as 85 per cent. in the Channel Islands. The total duration of sunshine for the whole season was largely in excess of the average in all but the south-western districts; in our eastern and southern counties, and also in the Channel Islands, the sun shone brightly for more than half the time he was above the horizon. The difference from the average appears to have been greatest in the north-eastern, eastern, and southern districts. In the north-east, usually the least favoured part of the country, the average daily duration for the whole summer is only $5\frac{1}{4}$ hours; last summer it was very nearly $6\frac{3}{4}$. A comparison with previous seasons shows that in most districts the summer was the sunniest of recent years with the exception of that of 1899, when the duration of sunshine was much greater than in 1901.

THE AUTUMN OF 1901.

Throughout the greater part of the autumn the atmosphere seemed to be in an almost constant state of unrest, no well-defined type of weather lasting for more than a very few days together. September opened fine and dry, but towards the middle of the month the conditions became cloudy and unsettled, with a decided excess of rain in the third week. The early days of October were extremely rough and unsettled, and on the 6th a stiff gale from west or north-west prevailed over nearly the whole kingdom. After this the weather gradually improved, and for the remainder of the month a deficiency of rain was reported in most districts, temperature being as a rule slightly below the average. At the close of October the conditions became drier and more settled than for some little time past, the early days of November being, however, rendered very disagreeable by the prevalence of dense and protracted fogs. In the second week of November an entire change in the weather took place, and on the 12th and 13th a deep cyclonic disturbance advanced from the Atlantic, the centre of the storm passing eastwards directly across Ireland and England. During its progress a tremendous fall of rain occurred in Ireland and the northern parts of England and Wales, while a hard gale prevailed over the whole kingdom, the wind being from the south-westward or westward in the south, but from the eastward or north-eastward in the north.

The disastrous effects of the storm were soon shown in a terribly long list of fatal maritime casualties, the bulk of these occurring along the north and east coasts, where the wind blew dead on shore. After the gale subsided the weather settled down into quite a wintry state, the whole country being visited in the middle of November by a frost of unusual severity for the time of year. Dense fogs also reappeared over all the inland parts of England, and the general conditions were about as inclement as they could well be for so early a period in the season. Later on a westerly wind of increasing strength set in, with gales in most districts on the 19th, and for a few days the weather was therefore again mild, with considerable falls of rain in the north. Towards the end of the month, however, the wind, after falling light and variable, settled down into the northward, so that the weather again became cold, with more fog in all the inland parts of the country. In London the prevalence of fog last November was greater than in any year since 1892, the number of days affected being 14, or 5 more than the average for the 30 years 1871–1900.

Autumn Temperature.—After a cool week at the beginning of the season the mean temperature was above the average until the end of the first week in October, the excess being large at the close of September. For the remainder of the autumn the thermometer was as a rule below the normal, the only weeks with any general excess of warmth being those ending October 19, November 2, and November 23. Taking the season as a whole the mean temperature was below the average in the central and southern districts, but a trifle above it in the northern and eastern. In some parts of the midland counties the autumn was the coolest experienced since that of 1896. The highest temperatures of the season were recorded, over the country generally, at the close of September—mostly on the 29th, when the thermometer rose to 75° and upwards in many parts of the eastern, central, and southern districts, and reached a maximum of 77° at Hillington in Norfolk. The lowest temperatures of the autumn were registered in most places between November 15 and 17, when the sheltered thermometer fell below 20° at many inland stations.

Autumn Rainfall.—Throughout the greater part of the season there was a deficiency of rainfall, the only weeks with anything like a general excess being the third in September and the second in November. In the latter case the excess was very large in all the more northern parts of the country. Notwithstanding this, the total fall for the whole season was in all places considerably less than the average, the deficit being very large in the eastern and midland counties. At Yarmouth the aggregate rainfall amounted to less than two-thirds of the average, while at Loughborough it was rather less than half the normal, the autumn being in the latter district the driest since that of 1884. In a season that was for the most part so dry, heavy individual falls of rain were naturally rare. On September 16 more than an inch was experienced at several places in South Wales, and the west and south of England, and as much as an inch and a-half at Plymouth. On October 21 a still heavier fall occurred in the extreme north of England, the amount measured at North Shields being as much as 1·8 inch. The worst case of all occurred, however, on November 11 and 12, when the whole of our northern districts were visited by a downpour of almost tropical severity. On each of these days more than two inches fell in many places, the aggregate amount for the 48 hours ending with

Rainfall, Temperature *and* **Bright Sunshine** *experienced over* **England** *and* **Wales** *during the whole of* **1900,** *with Average and Extreme Values for Previous Years.*

Districts	Rainfall							
	Total Fall				No. of Days with Rain			
	In 1900	For previous 34 years			In 1900	For previous 19 years		
		Average	Extremes			Average	Extremes	
			Driest	Wettest			Driest	Wettest
	in.	in.	in.	in.				
North-eastern counties .	29·2	25·8	19·9 (1884)	37·2 (1872)	188	187	162 (1884)	208 (1894)
Eastern counties . .	23·9	25·2	19·1 (1874 and 1887)	33·1 (1872)	189	182	156 (1898)	205 (1894)
Midland „ . .	28·5	27·8	19·2 (1887)	39·8 (1872)	183	178	148 (1887)	210 (1882)
Southern „ . .	27·3	28·6	21·5 (1887)	41·7 (1872)	175	172	137 (1899)	197 (1882)
North-western counties, including North Wales	38·7	38·5	24·9 (1887)	59·2 (1872)	202	196	163 (1887)	222 (1882)
South-western counties, including South Wales	44·5	42·5	28·3 (1887)	68·6 (1872)	213	198	159 (1887)	235 (1882)
Channel Islands[1] . .	33·9	32·5	26·2 (1887)	39·5 (1882)	219	211	169 (1899)	251 (1886)

Districts	Mean Temperature				Hours of Bright Sunshine			
	In 1900	For previous 34 years			In 1900	For previous 19 years		
		Average	Extremes			Average	Extremes	
			Coldest	Warmest			Cloudiest	Sunniest
	°	°	°	°				
North-eastern counties .	48·2	47·3	45·0 (1879)	49·2 (1898)	1201	1292	1006 (1885)	1558 (1893)
Eastern counties . .	49·5	48·4	45·8 (1879)	51·0 (1868)	1680	1558	1267 (1888)	1864 (1899)
Midland „ . .	48·9	48·4	45·8 (1879)	51·1 (1868)	1397	1410	1173 (1888)	1715 (1893)
Southern „ . .	50·6	49·6	46·9 (1879)	51·6 (1898)	1737	1575	1245 (1888)	1983 (1899)
North-western counties, including North Wales	48·9	48·5	45·9 (1879)	50·3 (1868 and 1893)	1495	1350	1198 (1888)	1606 (1899)
South-western counties, including South Wales	50·2	50·2	48·3 (1888)	52·8 (1868)	1734	1663	1459 (1888)	1964 (1893)
Channel Islands[1] . .	53·4	52·1	50·7 (1885)	54·3 (1899)	1934	1923	1710 (1888)	2300 (1893)

NOTE.—The above Table is compiled from information given in the Weekly Weather Report of the Meteorological Office.

[1] For the Channel Islands the "Averages" and "Extremes" of Rainfall and Mean Temperature are for the previous nineteen years only.

The Rainfall of 1900 *and of the previous Ten Years, with the Average Annual Fall for a long period, as observed at thirty-eight stations situated in various parts of the United Kingdom.*

Stations	1900		Rainfall of Previous Years										Average Rain fall
	Total Rain-fall	Difference from Average	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	
	In.	Per. cent.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
ENGLAND AND WALES:													
Durham	28·8	+ 4	24·5	20·8	21·8	24·5	27·6	23·7	20·1	28·1	24·6	26·0	27·6
York	25·8	+ 1	22·4	23·7	24·4	22·2	25·8	28·0	22·3	24·7	23·8	22·7	25·6
Hillington	32·6	+19	24·7	22·1	26·3	29·7	26·9	29·9	22·3	27·0	28·9	23·5	27·3
Yarmouth	24·7	− 6	22·4	20·9	20·8	21·3	23·3	26·8	19·5	30·5	24·2	24·1	26·4
Cambridge	19·7	−14	19·3	17·9	20·4	20·7	22·8	23·0	21·4	25·7	26·0	17·9	22·8
Rothamsted	27·1	− 4	25·1	18·7	25·0	29·0	25·4	29·6	23·8	23·8	30·5	23·5	28·1
Loughborough	28·7	+12	23·1	20·0	23·9	23·5	23·0	21·0	19·1	21·0	30·0	19·0	25·6
Cheadle	37·5	+12	30·9	27·8	32·8	29·3	29·5	27·2	27·4	31·3	35·7	28·5	33·6
Hereford	32·8	+22	26·7	22·4	26·7	18·2	24·1	29·2	18·9	21·3	27·5	18·2	26·9
Cirencester	31·0	− 1	26·8	22·1	32·7	23·6	25·8	35·2	20·7	23·8	36·5	22·2	31·2
Oxford	23·6	− 7	21·0	19·1	26·3	23·5	22·5	29·7	17·6	20·5	27·5	17·8	25·3
London	22·2	− 9	22·0	17·8	23·3	22·7	21·4	28·7	19·2	23·0	28·1	22·8	24·4
Hastings	29·8	+ 2	25·8	23·0	28·1	29·9	28·6	35·8	27·2	26·9	30·6	29·1	29·2
Southampton	31·6	+ 2	27·6	26·6	32·6	26·3	28·3	34·9	23·5	23·9	38·8	26·4	30·9
Stonyhurst	48·3	+ 1	47·5	47·9	51·3	44·2	42·4	50·5	50·7	48·3	46·9	50·2	47·9
Manchester	42·8	+13	33·5	33·2	39·1	38·4	34·2	39·2	31·9	42·4	39·9	33·9	37·8
Liverpool	31·9	+11	27·6	25·6	28·4	26·6	26·2	28·1	24·4	33·0	31·6	27·1	28·8
Llandudno	32·8	+ 5	32·4	31·3	30·7	30·4	30·1	29·1	26·6	33·5	32·8	28·2	31·2
Llandovery	52·8	+ 6	44·7	47·5	50·1	41·8	41·4	55·3	40·0	36·7	58·6	46·0	49·8
Clifton	37·7	+ 7	35·5	30·9	38·9	27·6	32·0	40·6	28·9	26·4	42·5	24·9	35·1
Cullompton	35·5	0	37·0	29·9	38·9	27·6	34·8	45·4	29·9	28·2	39·2	31·4	35·5
Plymouth	40·3	+11	33·1	29·2	40·4	29·1	37·8	42·5	31·0	28·9	39·8	36·6	36·3
Scilly (St. Mary's)	34·1	+ 1	31·9	27·1	35·7	25·8	29·9	38·0	26·5	28·1	36·9	32·4	33·6
Jersey (St. Aubin's)	34·6	+ 2	26·3	30·0	36·2	33·2	34·7	39·1	29·7	31·2	35·6	33·8	33·9
[2] Mean for the whole of England and Wales	32·3	+ 2	28·6	26·2	31·3	28·5	29·0	33·1	25·6	28·3	33·5	28·8	31·6
SCOTLAND:													
Wick	33·1	+16	29·7	27·4	21·9	34·7	32·9	29·5	34·9	33·6	31·2	33·4	28·6
Aberdeen	34·0	+10	30·3	27·5	28·7	31·2	35·8	28·5	28·5	29·8	28·5	32·4	30·8
Braemar	40·5	+13	35·6	36·5	36·8	30·2	32·7	41·9	30·8	28·1	34·4	39·2	36·0
Leith	31·2	+33	24·8	19·9	20·5	21·7	21·9	26·1	19·2	20·6	22·6	26·0	23·4
Fort Augustus	50·5	+19	42·3	54·3	41·9	42·6	43·4	54·7	47·3	44·5	48·2	49·3	42·5
Fort William	82·1	+ 6	72·2	102·4	74·7	71·1	58·1	78·8	83·7	72·7	78·7	89·2	77·7
Glasgow	47·0	+18	43·5	37·4	39·7	35·9	32·9	42·8	33·9	37·1	36·5	38·9	39·8
Glenlee	67·0	+17	59·8	54·5	62·2	50·7	47·8	62·1	47·8	53·5	60·7	54·6	57·3
[2] Mean for the whole of Scotland	52·2	+26	46·1	47·4	41·5	43·7	39·7	45·6	42·8	41·5	44·5	46·9	41·3
IRELAND:													
Londonderry	45·3	+12	38·0	41·3	41·6	41·9	39·5	40·4	38·9	39·9	36·4	42·5	40·3
Markree Castle	45·3	+ 9	43·7	40·4	46·1	42·3	38·4	44·3	36·2	41·8	38·6	40·8	41·6
Armagh	36·4	+16	32·5	31·8	35·1	31·2	30·5	33·1	24·3	32·5	28·8	30·1	31·5
Dublin	34·3	+23	27·7	27·1	29·4	26·9	31·2	29·3	20·5	25·7	27·8	27·6	27·8
Parsonstown	38·5	+17	33·1	34·2	37·8	32·4	29·0	35·9	28·3	33·9	31·8	30·7	33·0
Kilkenny	39·2	+20	30·9	29·1	41·4	29·2	33·7	38·2	26·5	32·1	34·6	31·2	32·8
[2] Mean for the whole of Ireland	44·9	+13	40·6	38·6	44·5	38·0	36·8	40·8	33·3	39·1	38·4	40·1	39·7

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[1] The Average Fall is in nearly all cases deduced from observations extending over the thirty-five years 1866–1900.

[2] The Mean Rainfall for each country is based upon observations made at a large number of stations in addition to those given above.

the morning of the 13th being as large as 3·8 inches at Stonyhurst, 3·6 inches at Douglas (Isle of Man), and 3·5 inches at Darwen. At Stonyhurst the fall in these two days was as much as 84 per cent. of the average for the whole of November. The only other important rainfall occurred on November 18 and 19, when Lancashire was again the scene of a heavy downpour, the aggregate fall at Stonyhurst in the two days being as much as 2·9 inches. Snow and sleet fell in many parts of the country between November 13 and 15, and again in some of the northern districts on November 22.

Bright Sunshine in Autumn.—In the early part of the season this was rather deficient, the only really fine week being that ending September 7. Later on, however, the tendency was all the other way, and although the amount of sunshine varied greatly in different parts of the country, a general excess was reported in most weeks, excepting the second in November, when the southern districts were alone favoured. Taking the season as a whole there appears to have been a deficiency in most districts, the departure from the normal being, however, small in all but our south-eastern counties. In London the total duration of sunshine was much smaller than in either of the three preceding autumns. At some places in the north-west of England the total was somewhat in excess of the average.

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(*December* 12, 1901.)

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	LONDON	471	2	H.R.H. The Prince of Wales, K.G., T.; Rt. Hon. Henry Chaplin, V.P.
	MIDDLESEX . . .	79	1	G. H. Sanday.
	NORFOLK	267	1	Garrett Taylor.
	OXFORDSHIRE . .	132	3	Earl of Jersey; Lord Moreton, V.P.; M. J. Sutton.
	SUFFOLK	210	2	J. E. Ransome; A. J. Smith.
		——2,082	— 15	
B.	CUMBERLAND . .	128	1	S. P. Foster.
	DURHAM	162	1	Earl of Ravensworth, V.P.
	NORTHUMBERLAND	236	2	Viscount Ridley, T.; Sir Jacob Wilson, V.P.
	WESTMORLAND . .	80	2	Lord Brougham and Vaux; C. W. Wilson.
		—— 606	— 6	
C.	DERBYSHIRE . . .	194	1	H. Chandos-Pole-Gell, V.P.
	LEICESTERSHIRE .	190	1	Marquis of Granby.
	LINCOLNSHIRE . .	283	3	Sir J. H. Thorold, T.; W. Frankish; H. D. Marshall.
	NORTHAMPTONSHIRE	185	3	Earl Spencer, K.G., T.; J. Hornsby; A. Pell.
	NOTTINGHAMSHIRE	215	1	Henry Smith.
	RUTLAND	38	...	
		——1,105	— 9	

DISTRIBUTION OF MEMBERS OF THE SOCIETY—*continued.*

Districts	Counties	Number of Governors and Members	Number of Members of Council	Names of Members of Council
D.	Berkshire . .	183	4	H.R.H. Prince Christian, K.G., P.; Visct. Bridport, T.; P. Crutchley; Alexander Henderson.
	Cornwall . . .	101	1	J. C. Williams.
	Devonshire . . .	136	1	Sir Massey Lopes, V.P.
	Dorsetshire . .	72	...	
	Hampshire . . .	213	1	Viscount Baring.
	Kent	478	3	C. Whitehead, V.P.; Lord Arthur Cecil; F. S. W. Cornwallis.
	Somersetshire . .	115	1	R. Neville Grenville.
	Surrey	207	...	
	Sussex	328	3	Duke of Richmond and Gordon, K.G., T.; H. Gorringe; R. A. Warren.
	Wiltshire . . .	137	1	George Blake.
		——1,970	— 15	
E.	Yorkshire . . .	—— 775	— 6	Earl of Feversham, V.P.; Lord Middleton; A. E. Pease; F. Reynard; W. Scoby; E. W. Stanyforth.
F.	Gloucestershire .	288	2	Col. Sir Nigel Kingscote, T.; Lt.-Col. J. F. Curtis-Hayward.
	Herefordshire	141	2	J. H. Arkwright, V.P.; C. C. Rogers.
	Monmouthshire .	50	1	R. Stratton.
	Shropshire . . .	308	2	J. Bowen-Jones; A. Darby.
	Staffordshire. .	298	1	Capt. W. S. B. Levett.
	Warwickshire. .	261	2	P. A. Muntz; H. P. Ryland.
	Worcestershire .	208	2	Earl of Coventry, V.P.; E. V. V. Wheeler.
	South Wales . .	234	1	Earl Cawdor, T.
		——1,788	— 13	
G.	Cheshire	447	3	Earl Egerton of Tatton, T.; Hon. Cecil T. Parker, V.P.; A. Ashworth.
	Lancashire . . .	473	4	Earl of Derby, K.G., T.; R. C. Assheton; Victor C. W. Cavendish; T. H. Miller.
	North Wales . .	202	3	J. M. Dugdale; R. M. Greaves; C. S. Mainwaring.
		——1,122	— 10	
Scotland		212		
Ireland		155		
Channel Islands		11		
Isle of Man		10		
Foreign Countries		190		
Honorary Members		28		
		—— 616		
Grand Totals		——10,054	74	

GOVERNORS OF THE SOCIETY.

	Date of election as Member	Date of election as Governor
HIS MAJESTY THE KING, Windsor Castle	—	Feb. 3, 1864
T †H.R.H. THE PRINCE OF WALES, K.G....York House, St. James's Palace, S.W., and Sandringham, Norfolk	—	April 6, 1892
†H.R.H. THE DUKE OF CAMBRIDGE, K.G....Gloucester House, Piccadilly, W.	—	Aug. 6, 1862
P H.R.H. PRINCE CHRISTIAN OF SCHLESWIG-HOLSTEIN, K.G....Cumberland Lodge, Windsor	—	Aug 4, 1875
†ALLCROFT, Herbert John...Stokesay Court, Onibury, Salop	—	Dec. 12, 1889
†AMHERST OF HACKNEY, Lord...Didlington Hall, Brandon	Feb. 2, 1859	May 7, 1890
ANCASTER, Earl of...Normanton Park, Stamford	Mar. 3, 1869	May 5, 1875
ARCHER-HOUBLON, George B....Hallingbury Place, Bishop's Stortford	—	Mar. 6, 1889
VP †ARKWRIGHT, J. Hungerford...Hampton Court, Leominster	—	June 5, 1861
ASHBURTON, Lord...The Grange, Alresford, Hants	—	May 7, 1890
BARNARD, Lord...Raby Castle, Darlington	—	July 27, 1892
†BATES, CADWALLADER J.,...Langley Castle, Northumberland	Feb. 7, 1883	May 30, 1900
T†BEDFORD, Duke of...Woburn Abbey, Bedfordshire	—	May 3, 1893
†BEEVER, W. F. Holt...Yewden Lodge, Henley-on-Thames	April 2, 1879	June 6, 1894
†BELPER, Lord...Kingston, Derby	July 6, 1881	Mar. 6, 1895
†BENN, Thomas G....Reigny House, Newton Reigny, Penrith	Mar. 13, 1878	Aug. 2, 1882
†BLYTH, Sir James, Bart....Blythwood, Stansted, Essex	Nov. 3, 1875	July 27, 1892
BRASSEY, Henry Leonard C....Preston Hall, Aylesford, Kent	—	Feb. 3, 1892
T BRIDPORT, Gen. Viscount, G.C.B....Royal Lodge, Windsor Great Park, Berkshire	Jan. 19, 1842	April 2, 1862
BURGHCLERE, Lord...48 Charles Street, Berkeley Square, W.	—	Dec. 7, 1892
BURTON, Lord...Rangemore, Burton-on-Trent	Nov. 7, 1888	June 25, 1890
CADOGAN, Earl, K.G...Culford Hall, Bury St. Edmunds	—	Dec. 11, 1889
CALTHORPE, Lord...Elvetham, Winchfield	Nov. 7, 1883	May 2, 1894
†CATHCART, Earl...Thornton-le-Street, Thirsk	Feb. 6, 1856	April 3, 1867
‖†CAVENDISH, Victor C.W., M.P....Holker Hall, Cark-in-Cartmel, Lancashire	—	Mar. 2, 1892
T†CAWDOR, Earl...Stackpole Court, Pembrokeshire	Mar. 3, 1863	Mar. 2, 1892
†CAWSTON, George...The Manor House, Cawston, Norfolk	—	June 6, 1894
VP †CHANDOS-POLE-GELL, H....Hopton Hall, Wirksworth, Derbyshire	Nov. 6, 1861	June 23, 1891
VP CHAPLIN, Rt. Hon. Henry, M.P....Stafford House, S.W.	—	Nov. 2, 1870
CHELSEA, Viscount, M.P....31A Green Street, Park Lane, W.	—	Feb. 6, 1895
†CLARENDON, Earl of...The Grove, Watford	June 5, 1872	May 2, 1894
†CLINTON, Lord...Heanton Satchville, Beaford, N. Devon	April 3, 1867	April 2, 1890
‖CORNWALLIS, Fiennes S. W....Linton Park, Maidstone	—	July 2, 1884
VP †COVENTRY, Earl of...Croome Court, Severn Stoke, Worc.	April 1, 1863	April 4, 1894
†COWPER, Earl, K.G....Panshanger, Hertford	—	April 7, 1875
†COX, Fred...Harefield Place, Uxbridge	—	July 31, 1901
CRAVEN, Thomas...Woodheyes Park, Ashton-on-Mersey	May 6, 1891	Dec. 6, 1893
CREWE, Earl of...Crewe Hall, Crewe, Cheshire	Feb. 6, 1884	Mar. 7, 1894
DARTMOUTH, Earl of...Patshull Hall, Wolverhampton	—	Dec. 9, 1891
T†DERBY, Earl of, K.G., G.C.B....Knowsley, Prescot	June 3, 1874	May 2, 1894

P President. T Trustee. † Life Governor VP Vice-President. ‖ Member of Council.

	Date of election as Member	Date of election as Governor
Derwent, Lord...Hackness Hall, Scarborough	—	April 7, 1869
†De Trafford, Sir H. F., Bart....18 Arlington Street, W.	Aug. 1, 1883	June 1, 1892
†Devonshire, Duke of, K.G....Chatsworth, Chesterfield	—	June 2, 1880
†Dewhurst, G. Littleton...Beechwood, Lymm, Cheshire	Dec. 9, 1891	May 2, 1894
†Dickson-Poynder, Sir J., Bart., M.P....Hartham Park, Corsham, Wilts	Nov. 2, 1887	April 2, 1890
Digby, Lord...Minterne House, Cerne Abbas, Dorset	—	July 25, 1894
†Duleep-Singh, Prince Frederick...Old Buckenham Hall, Attleborough	—	July 25, 1894
Duncombe, W. H. O...Waresley Park, Sandy, Beds	April 1, 1885	May 6, 1896
†Dunmore, Earl of...Carlton Club, Pall Mall, S.W.	—	Feb. 3, 1869
†Durham, Earl of...Lambton Castle, Durham	—	July 14, 1880
T Egerton of Tatton, Earl...Tatton Park, Knutsford	Mar. 6, 1872	Nov. 7, 1883
†Ellesmere, Earl of...Worsley Hall, Manchester	—	July 7, 1869
Essex, Earl of...Cassiobury Park, Watford	Nov. 7, 1888	Nov. 2, 1892
Exeter, Marquis of...Burghley House, Stamford	May 4, 1898	June 21, 1898
VP Feversham, Earl of...Duncombe Park, Helmsley, Yorks	Mar. 5, 1862	Mar. 3, 1875
Fife, Duke of, K.T....15 Portman Square, W.	—	Nov. 7, 1888
Fitzwilliam, Earl, K.G....Wentworth Woodhouse, Rotherham	—	June 5, 1872
*Fletcher, John Philip...Darby Lodge, Sunbury-on-Thames	Feb. 19, 1840	Mar. 5, 1890
†Fortescue, Earl...Castle Hill, South Molton	—	Nov. 6, 1861
†Freeman-Mitford, A. B., C.B....Batsford Park, Moreton-in-the-Marsh, Gloucestershire	—	Nov. 3, 1886
†Fytche, J. Lewis...The Terrace, Freshwater, Isle of Wight	April 5, 1854	June 4, 1879
T Gilbey, Sir Walter, Bart...Elsenham Hall, Essex	Nov. 2, 1870	June 5, 1889
Glenesk, Lord...Heath House, Hampstead Heath, N.W.	—	Dec. 12, 1888
Gordon, H. Panmure...Loudwater House, Rickmansworth	July 27, 1892	Mar. 1, 1893
Grafton, Duke of, K.G....Wakefield Lodge, Stony Stratford	—	June 3, 1884
†Grant, Sir G. Macpherson, Bt....Ballindalloch Castle, N.B.	April 1, 1863	April 2, 1890
†Greenall, Sir Gilbert, Bart....Walton Hall, Warrington	Feb. 3, 1892	May 2, 1894
Griffiths, John James...Highbury Grange, Highbury, N.	—	May 1, 1889
Groves, James G....Oldfield Hall, Altrincham, Cheshire	—	May 1, 1895
Gwynne, John...Kenton Grange, The Hyde, N.W.	—	Mar. 5, 1879
Hanbury, Rt Hon. R. W, M.P ...Ilam Hall (Staffordshire), Ashbourne	Nov. 7, 1888	June 5, 1901
Harewood, Earl of...Goldsboro' Hall, Knaresborough	June 6, 1883	Nov. 2, 1892
Hay, Arthur W. H....Oakley Park, Hoxne, Suffolk	—	Nov. 4, 1896
‖†Henderson, Alexander, M.P....Buscot Park, Faringdon, Berks.	Nov. 5, 1890	July 28, 1897
Henry, Mitchell...Kylemore Castle, co. Galway	Nov. 7, 1877	Dec. 10, 1890
†Henryson-Caird, James A., Cassencary, Creetown R S.O , Kirkcudbright	May 7, 1873	July 31, 1895
Hertford, Marquis of...Ragley Park, Alcester	Aug. 2, 1882	May 7, 1884
†Heywood, Sir Arthur Percival, Bt...Duffield Bank, Derby	April 7, 1875	Feb. 2, 1898
Hodgson, John...Nocton Hall, Nocton, Lincolnshire	—	Mar. 2, 1898
†Holford, Capt. George L., C.I.E....Westonbirt House, Tetbury, Glos.	—	April 6, 1892
†Hopetoun, Earl of...Hopetoun House, South Queensferry, N.B.	Nov. 7, 1888	July 31, 1895
‖†Hornsby, James...Laxton Park, Stamford	June 6, 1878	May 29, 1895

* Elected a Foundation Life Governor, March 5, 1890.
† Life Governor.
T Trustee.
VP Vice-President.
‖ Member of Council.

	Date of election as Member	Date of election as Governor
†Hothfield, Lord...Hothfield Place, Ashford, Kent	—	May 7, 1879
†Huth, Louis...Possingworth, Cross-in-Hand, Hawkhurst	Dec. 12, 1888	Feb. 6, 1895
†Irwin, Colonel Thomas A....Lynehow, Carlisle	May 5, 1880	June 25, 1895
†Iveagh, Lord, K.P....5 Grosvenor Place, S.W.	—	June 6, 1894
‖†Jersey, Earl of, G.C.B....Middleton Park, Bicester	June 30, 1875	April 4, 1894
Joicey, E....Blenkinsopp Hall, Haltwhistle, Northumberland	—	Dec. 12, 1888
†Jones, Walter J. H....Blakemere, Hartford, Cheshire	April 11, 1888	May 2, 1894
*Kemble, Thomas...Runwell Hall, Wickford, Essex	July 10, 1839	Mar. 5, 1890
T†Kingscote, Col. Sir Nigel, K.C.B....Kingscote, Wotton-under-Edge, Gloucestershire	April 6, 1854	July 1, 1874
Kohlapur, H.H. The Maharajah of...Kohlapur, India	—	Feb. 6, 1889
†Kynnersley, Thomas F....Leighton Hall, Ironbridge, Salop	Nov. 7, 1883	Nov. 4, 1891
†Lansdowne, Marquis of, K.G...Bowood, Calne, Wilts.	Feb. 3, 1875	Feb. 5, 1896
†Leconfield, Lord...Petworth House, Sussex	—	Mar. 6, 1901
†Leicester, Earl of, K.G...Holkham Hall, Norfolk	—	Nov. 15, 1843
†Leigh, Lord...Stoneleigh Abbey, Kenilworth.	—	Dec 1, 1858
†Llangattock, Lord...The Hendre, Monmouth	Mar. 1, 1871	May 2, 1894
Londonderry, Marquis of, K.G....Seaham Hall, Seaham Harbour, co. Durham	—	June 3, 1885
†Long, Rt. Hon. Walter H., M.P....Rood Ashton, Trowbridge, Wilts	Aug. 4, 1880	Dec. 11, 1895
†Lonsdale, Earl of...Lowther Castle, Penrith	—	July 4, 1883
VP†Lopes, Rt. Hon. Sir Massey, Bt...Maristow, Roborough, Devon	Mar. 15, 1848	May 7, 1884
Lucas, Sir Thomas, Bart...12A Kensington Palace Gardens, W.	—	Dec. 12, 1888
McCalmont, Harry, M.P....Cheveley Park, Newmarket	—	Feb. 7, 1894
†Mason, James...Eynsham Hall, Witney, Oxon.	May 1, 1867	May 2, 1894
‖Middleton, Lord...Birdsall House, York	—	Mar. 3, 1875
*Monck, J. Bligh...Coley Park, Reading	May 23, 1839	Mar. 5, 1890
†Moorsom-Mitchinson-Maude, C. R....Harewood, Leeds	Dec. 2, 1857	July 26, 1893
VP†Moreton, Lord...Sarsden House, Chipping Norton, Oxon.	—	Mar. 3, 1875
†Morewood, C. R. Palmer...Alfreton Park, Derbyshire	April 7, 1875	Feb. 7, 1894
†Morrell, Lt.-Col. G. H., M.P....Headington Hill Hall, Oxford.	June 6, 1878	July 25, 1894
†Mount-Edgcumbe, Earl of...Mount-Edgcumbe, Plymouth	Nov. 6, 1861	Mar. 5, 1890
Muncaster, Lord...Muncaster Castle, Ravenglass, Cumberland	—	June 23, 1891
Neeld, Lieut.-Col Sir Audley D., Bart., M.V.O....Grittleton, Chippenham	—	July 31, 1901
Norfolk, Duke of, K.G....Arundel Castle, Sussex	—	July 29, 1891
†Northbrook, Earl of...Stratton, Micheldever Station, Hants	—	June 2, 1880
†Palmer, Walter...Frognal, Sunninghill, Berks.	—	Feb. 1, 1899
Park, Philip...The Oaks, Penwortham, Preston	—	Nov. 4, 1896
VP†Parker, Hon. Cecil T...Eccleston, Chester	April 7, 1876	May 25, 1898
†Peel, Edmund.. Brynypys, Ellesmere, Salop	Feb. 3, 1858	Mar. 5, 1890
†Platt, Col. Henry...Gorddinog, Llanfairfechan	Mar. 5, 1862	Feb. 3, 1897
†Platt, James E....Howbury Hall, near Bedford	June 30, 1886	May 1, 1895
†Portland, Duke of, K.G...Welbeck Abbey, Worksop	—	June 2, 1880
†Portman, Viscount...Bryanston, Blandford	Aug. 6, 1862	Mar. 5, 1890
Portsmouth, Earl of...Hurstbourne Park, Whitchurch, Hants	—	Dec. 9, 1891
†Powis, Earl of...Powis Castle, Welshpool	April 6, 1887	June 23, 1891

* Elected a Foundation Life Governor, March 5, 1890. † Life Governor.
T Trustee. VP Vice-President. ‖ Member of Council.

	Date of election as Member	Date of election as Governor
†QUILTER, Sir W. Cuthbert, Bart., M.P...Bawdsey Manor, Woodbridge	Mar. 3, 1886	April 7, 1897
†RAMSDEN, Lt.-Col. W. J. F....Rogerthorpe Manor, Pontefract	May 2, 1883	June 25, 1895
VP RAVENSWORTH, Earl of...Ravensworth Castle, Gateshead	Feb. 5, 1868	July 1, 1885
REISS, James E....36 Cadogan Square, S.W.	Feb. 7, 1883	May 2, 1894
T*†RICHMOND & GORDON, Duke of, K.G...Goodwood, Chichester	June 20, 1838	Dec. 2, 1868
T†RIDLEY, Viscount......Blagdon, Cramlington, Northumberland	April 7, 1869	May 5, 1886
†RIDLEY, Hon. M. W., M.P....36 Portland Place, W.	—	June 5, 1901
RIPON, Marquis of, K.G....Studley Royal, Ripon	—	July 3, 1861
ROLLE, Hon. Mark...Bicton, Budleigh Salterton, Devon	—	Nov. 7, 1894
†ROSEBERY, Earl of, K.G...38 Berkeley Square, W.	—	June 6, 1894
ROTHSCHILD, Leopold de...Ascott, Wing, Leighton Buzzard	—	Mar. 1, 1893
ROTHSCHILD, Lord...148 Piccadilly, W.	Nov. 7, 1888	June 4, 1890
RUTLAND, Duke of, K.G....Belvoir Castle, Leicestershire	Dec. 12, 1888	Dec. 9, 1891
†SALISBURY, Marquis of, K.G....Hatfield House, Herts	—	Feb. 6, 1889
SALOMONS, Leopold...Norbury Park, Dorking	—	May 6, 1896
†SCHRÖDER, Baron J. H. W....The Dell, Staines	Nov. 3, 1869	April 2, 1890
*§SIMONDS, Prof. James Beart...St. John's Villa, Ryde, I.W.	July 25, 1838	Mar. 5, 1890
*SIMONDS, W. Barrow...Abbotts Barton, Winchester	June 19, 1839	Mar. 5, 1890
SMITH, Hon. W. F. D., M.P...3 Grosvenor Place, S.W.	—	Dec. 9, 1891
†SMYTH, Sir J. H. Greville, Bart...Ashton Court, Bristol	—	July 3, 1878
*SPARKS, Major William...Crewkerne, Somerset	June 6, 1838	Mar. 5, 1890
T SPENCER, Earl, K.G...Althorp Park, Northampton	Dec. 5, 1860	Mar. 3, 1875
‖†STANYFORTH, E. Wilfrid...Kirk Hammerton Hall, York	Feb. 6, 1884	July 31, 1895
*STRATTON, J. Locke...Turweston House, Brackley	May 13, 1839	Mar. 5, 1890
STUBS, Peter...Blaisdon Hall, Newnham, Glos.	July 27, 1892	Dec. 12, 1894
SUTHERLAND, Duke of...Trentham, Stoke-on-Trent	Mar. 1, 1882	Dec. 7, 1892
‖†SUTTON, Martin J...Henley Park, Oxfordshire	May 1, 1878	Feb. 1, 1882
†SWINBURNE, Sir John, Bart....Capheaton, Newcastle-on-Tyne	May 1, 1867	May 7, 1890
†TANQUERAY, John S...Balmain, 5 Albany Road, St. Leonards	Feb. 16, 1848	May 8, 1849
†THOMPSON, Henry Yates...19 Portman Square, W.	—	Nov. 7, 1894
T†THOROLD, Sir John H., Bart....Syston Park, Grantham	Aug. 5, 1868	May 1, 1889
TREDEGAR, Lord...Tredegar Park, Newport, Mon.	—	May 3, 1876
†TRENCH, Col. the Hon. Wm. Le Poer...3 Hyde Park Gardens, W.	Dec. 12, 1888	May 1, 1901
TURBERVILL, Col. J. P....Ewenny Priory, Bridgend	Mar. 5, 1884	July 27, 1892
†TWEEDMOUTH, Lord...Guisachan, Beauly, N.B.	—	July 31, 1889
WALTER, Arthur F....Bearwood, Wokingham	—	Mar. 6, 1895
‖†WARREN, Reginald A....Preston Place, near Worthing	June 3, 1857	June 6, 1894
WATSON, William C....Colworth, Bedford	—	Dec. 11, 1895
WESTMINSTER, Duke of...Eaton Hall, Chester	—	May 30, 1900
VP†WHITEHEAD, Charles...Barming House, Maidstone	April 1, 1857	Feb. 6, 1889
†WILLIAMS, Henry...Moor Park, Harrogate	Aug. 1, 1883	Mar. 6, 1895
WILLOUGHBY DE BROKE, Lord...Kineton House, Warwick	—	Dec. 10, 1890
VP†WILSON, Sir Jacob...Chillingham Barns, Belford, Northmbd.	Dec. 5, 1860	Dec. 7, 1892
†WINDSOR, Lord...Hewel Grange, Bromsgrove	—	Nov. 6, 1878
†YERBURGH, Robert A., M.P...Woodfold Park, Blackburn	—	Nov. 7, 1888
†ZETLAND, Marquis of, K.T....Aske Hall, Richmond, Yorks.	Feb. 4, 1874	May 2, 1894

* Elected a Foundation Life Governor, March 5, 1890. † Life Governor. § Honorary Member.
T Trustee. VP Vice-President. ‖ Member of Council.

HONORARY MEMBERS OF THE SOCIETY.

(*"British Subjects or Foreigners who have rendered exceptional services to Agriculture or Allied Sciences," and who have been elected under Bye-law 8 as Honorary Members, without payment of subscription.*)

	Date of election as Honorary Member
Arnim, Berndt von...Criewen, Brandenburg, Germany	June 21, 1899
Bang, Dr. B....Professor at the Royal Veterinary College, Copenhagen	July 31, 1901
Brown, Professor Sir George T., C.B....Bryn Hyfryd, Harrow (Ordinary Member, Dec. 3, 1862)	April 1, 1878
Cartuyvels-van-der-Linden, Jules, M.A....215 Rue de la Loi, Brussels	Dec. 11, 1895
Chauveau, Prof. Auguste, M.D., LL.D....10 Avenue Jules Janin, Passy, Paris	Dec. 6, 1893
Cope, Alexander C....Board of Agriculture, 4 Whitehall Place, S.W. (Ordinary Member, Dec. 6, 1893)	May 1, 1901
Dannfelt, Carl Juhlin B....Consul-Genl. of Sweden and Norway, 24 Great Winchester St., E.C.	Feb. 1, 1871
De Vogüé, Marquis...2 Rue Fabert, Paris (Ordinary Member, June 1, 1892)	June 21, 1899
Etzdorf, Landrath von...Elbing, West Prussia	May 30, 1900
Ewart, Prof. James Cossar, M.D., F.R.S....Regius Professor of Natural History at the University of Edinburgh	May 1, 1901
Fleischmann, Prof. Wm....Director of the Agricultural Institute of the Royal University of Königsberg	Dec. 12, 1894
Foster, Prof. Sir Michael, K.C.B., F.R.S....Nine Wells, Great Shelford, Cambridge	Feb. 3, 1897
Hohenbruck, Baron Arthur von. .I Niebelungengasse 8, Vienna	Nov. 5, 1890
Liveing, Prof. G. D., M.A., F.R.S....The University, Cambridge	Mar. 7, 1894
McFadyean, Prof. John, M.B., B.Sc., C.M., Royal Veterinary College, Camden Town, N.W. (Ordinary Member, Feb. 1, 1893)	May 1, 1901
Nobbe, Dr. J. C. F....Director of the Experimental Station, Tharand, Saxony	May 6, 1896
Nocard, Prof. Edmond...Ecole Vétérinaire, Alfort, France	Dec. 11, 1895
Passy, Louis...45 Rue de Clichy, Paris	June 23, 1891
Proskowetz, Emanuel Ritter von, Senr....Kwassitz, Moravia	Nov. 5, 1890
Salmon, Dr. D. E....Chief of the Bureau of Animal Industry, United States Department of Agriculture, Washington	July 31, 1901
Sanderson, Sir J. Burdon, Bart., F.R.S....Oxford	April 1, 1878
Scherbatoff, Prince Alexander...President of the Imperial Agricultural Society of Moscow, Russia	Nov. 3, 1897
Schlieffen, Count...Schlieffenburg, bei Lalendorf, Mecklenburg, Germany	Dec. 12, 1883
Sickesz van de Cloese, Dr. C. J....Heerengracht 17, The Hague, Holland	Dec. 9, 1891
Simonds, Prof. J. Beart...St. John's Villa, Ryde, Isle of Wight (Ordinary Member, July 25, 1838)	April 3, 1849
Thiel, Dr. H....Privy Councillor, and Director of the Department of Agriculture, 17 Lutherstrasse, Berlin	Aug. 1, 1883
Tisserand, Eugène...Ancien Directeur de l'Agriculture, 17 Rue du Cirque, Paris	Aug. 1, 1883

SUMMARY OF MEMBERS ON THE REGISTER,

December 12, 1901.

8 Foundation Life Governors (Members elected before the granting of the Charter on March 26, 1840).

70 Governors paying an annual subscription of 5*l*.

95 Life Governors who have compounded for their annual subscriptions.

6,289 Members paying an annual subscription of 1*l*.

3,449 Life Members who have compounded for their annual subscriptions.

115 Life Members by Examination.

28 Honorary Members.

10,054 Total number of Governors and Members at December 12, 1901.

Dr. BALANCE SHEET,

Corresponding figures for 1899 £		£ s. d.	£ s. d.	£ s. d.
22,248	To RESERVE FUND at December 31, 1899		20,786 2 7	
292	Interest on Consols		263 10 10	
407	„ „ Harewood House Debenture Stock		312 0 8	
730	Life Compositions received during 1900		424 0 0	
23,677			21,785 14 1	
2,391	Less: Contribution to Revenue (at 15*s.*) from 3,789 Life Members on Books on January 1, 1900 + 38 Compounders during 1900		2,870 5 0	
20,786				18,915 9 1
23,559	To CAPITAL as per last Account, represented by Securities, Books, Furniture, Machinery, Country Meeting Plant, Cash, &c.		16,632 13 0	
+172 +80	Less: Balance to debit of Ordinary Income and Expenditure Account, as per Statement (*A*)	51 15 7		
6,382	Balance to Debit of York Show Account, as per Statement (*B*)	3,464 17 8	3,516 13 3	
			15,115 19 9	
	Depreciation written off —			
243	Fixtures	224 8 0		
148	Furniture	139 15 5		
62	Machinery	55 13 5		
230	Country Meeting Plant	237 13 5		
113	Buildings for "Pot Experiments" at Woburn	50 0 0		
			707 10 3	
16,633				12,408 9 6
£37,419				£31,323 18 7

[*Note.*—The Society's Invested Assets, as stated in this Balance Sheet, are those held by it for the credit of its general Funds. In addition, it holds in its corporate name 8,126*l.* 8*s.* 2*d.* Consols, representing a Legacy of 9,000*l.* received in 1896 under the will of the late Mr. E. H. Hills. The income arising therefrom is, under the will, to be applied in the investigation of the value and uses of the rarer forms of ash in the cultivation of crops; and the Trust will be administered under the Charitable Trusts Acts.]

ERNEST CLARKE, *Secretary.*

WELTON, JONES & CO., *Accountants.*

SOCIETY OF ENGLAND.

DECEMBER 31, 1900.

Cr.

Correspond-ing figures for 1899 £		£ s. d.	£ s. d.	£ s. d.	£ s. d.
9,678	By 10.000*l.* CONSOLS at cost (Average cost 96*l.* 15*s.* 6¾*d.*)			9,677 16 3	
	Value on December 31, 1900, *at* 97½=9,750*l.*				
	[Of this 10,000*l.* Stock, 105*l.* is held against Special Prizes.]				
13,145	By 13,100*l.* HAREWOOD HOUSE DEBENTURE STOCK at Average cost to the Society (100*l.* 6*s.* 10*d*)			13,144 17 4	
				22,822 13 7	
——	Less : Loan from the Society's Bankers			5,000 0 0	
22,822					17,822 13 7
	By FIXTURES at Harewood House—		£ s. d.		
3,235	Value at December 31, 1899		2,992 0 5		
243	Less : Depreciation at 7½ per cent.		224 8 0		
2,992				2,767 12 5	
	By FURNITURE—				
3,132	Value at December 31, 1899		2,984 9 4		
148	Less: Depreciation at 7½ and 5 per cent.		139 15 5		
2.984				2,844 13 11	
1,500	By PICTURES (500*l.*) and BOOKS (1,000*l.*)			1,500 0 0	
	By MACHINERY—				
619	Value at December 31, 1899		558 14 1		
62	Less : Depreciation at 10 per cent.		55 13 5		
557				501 0 8	
	By COUNTRY MEETING PLANT—				
4,984	Value at December 31, 1899		4,753 8 3		
		£ s. d.			
	Less : Depreciation at 5 per cent.. .	237 13 5			
	„ Sales during 1900	7 0 6			
231			244 13 11		
4,753				4,508 14 4	
543	By Cost of WATER PIPES (less depreciation). . .			426 11 5	
1,113	By Cost of Erection of BUILDINGS for "POT EXPERIMENTS" at Woburn		1,000 0 0		
113	Less : Depreciation.		50 0 0		
1 000				950 0 0	
					13,498 12 9
597	By Sundry DEBTORS at December 31, 1900		579 13 0		
26	Expenditure on Account of 1901		11 15 0		
577	Cash at Bankers, December 31, 1900		432 16 2		
114	Cash in hands of Secretary		91 14 8		
	„ Consulting Chemist		21 9 6		
	„ Superintendent		85 2 6		
1,314				1,222 10 10	
544	Less : Sundry CREDITORS		1,022 12 8		
71	Subscriptions received in 1900, but belonging to 1901, and carried forward		58 0 0		
432	Net Receipts in connection with Cardiff Meeting, 1901		139 5 11		
1,047				1,219 18 7	
266					2 12 3
	[*Memorandum.*—The above Assets are exclusive of the value of the stock of Journals, Pamphlets, and Diagrams; and also of 532*l.*, the amount recoverable in respect of arrears of Subscriptions to December 31, 1900.]				
£37,419					£31,323 18 7

Examined, audited, and found correct, this 26th day of March, 1901.

HENRY GRINLING } *Auditors on behalf of the Society.*
JONAS M. WEBB }

(A) STATEMENT OF ORDINARY INCOME

Income.

Corresponding figures for 1899 £		£	s.	d.	£	s.	d.
	ANNUAL SUBSCRIPTIONS:—						
356	*Governors*: Subscriptions for 1900	273	0	0			
97	*Members*: Received in 1899, but belonging to 1900	71	0	0			
6,591	Subscriptions for 1900	6,466	0	0			
56	Subscriptions for previous years	68	0	0			
	Miscellaneous: Excess subscriptions, &c.	6	1	5			
7,100					6,884	1	5
	LIFE COMPOSITIONS:—						
2,891	Contribution to Revenue (See Balance Sheet)— 3,827 Life Members at 15s. each				2,870	5	0
+172	Debit Balance carried to Balance Sheet				51	15	7
£9,819					£9,806	2	0

ERNEST CLARKE, *Secretary.*

WELTON, JONES & CO., *Accountants.*

Expenditure.

Corresponding figures for 1899 £			£ s. d.	£ s. d.
	GENERAL ADMINISTRATION:—			
2,442	Proportion of Salaries of Official Staff (including Temporary Assistance)		2,541 14 0	
340	Pensions to Officials		340 0 0	
83	Professional Charges		40 19 0	
1,780	House Rent, Taxes, Insurance, and House Expenses		1,855 17 2	
22	Binding and Purchase of Books		22 1 6	
322	Printing and Stationery		349 1 2	
119	Postage and Telegrams		84 9 7	
13	Carriage of Parcels, and Cabs		12 2 0	
55	Advertising and Miscellaneous Office Expenses		36 7 10	
—	Interest on Bank Loan, less interest received on daily balances		52 8 1	
5,176				5,335 0 4
	JOURNAL OF SOCIETY AND OTHER PUBLICATIONS:—			
1,282	Printers' Bills for the four numbers of 1900		1,190 14 5	
135	Engravings and Illustrations		175 5 9	
803	Editor and Literary Contributions		757 0 9	
642	Postage, Packing, and Delivery		682 8 11	
40	Miscellaneous Journal Printing		46 15 0	
22	Miscellaneous Journal Expenses		13 18 3	
20	Cost of Printing Pamphlets, &c.		7 12 10	
10	Binding Text Book, "Elements of Agriculture"		21 0 5	
2,954			2,894 16 4	
166	Less: Received from Sales of Journal	£175 16 5		
402	Advertisements in Journal	393 18 2		
47	Sales of Pamphlets and Diagrams	66 10 1		
80	Sales of Text Book on Agriculture	101 18 3		
			738 2 11	
2,371				2,156 13 5
	LABORATORY:—			
1,100	Salaries, Wages, &c.		1,100 0 0	
40	Printing, and Sundry Expenses		44 7 3	
			1,144 7 3	
488	Less: Fees received from Members for Analysis		468 13 0	
651				675 14 3
	OTHER SCIENTIFIC DEPARTMENTS:—			
250	Consulting Botanist's Salary and Expenses		253 18 0	
200	Zoologist's Salary		200 0 0	
500	Grant to Royal Veterinary College		500 0 0	
200	Ditto Tuberculosis Inquiry		200 0 0	
41	Ditto for other Experiments (Calf feeding)		50 0 0	
3	Medals for Proficiency in Cattle Pathology		2 5 6	
29	Printing		2 9 0	
1,223				1,208 12 6
	EXAMINATION FOR NATIONAL DIPLOMA IN AGRICULTURE:—			
279	Honoraria and Expenses of Examiners		164 17 5	
	Travelling Expenses of Officials		37 15 6	
	Hotel Expenses of Examiners and Officials		39 4 7	
	Printing, Stationery, and Advertising		34 18 7	
	Travelling Expenses of Members of the Board		26 14 7	
	Cost of Gold Medal for best Candidate		7 16 6	
	Preliminary Expenses for Gold Medal and Diploma		25 19 0	
			337 6 2	
	Less: Deposits forfeited		36 0 0	
			301 6 2	
	Less: Moiety received from Highland and Agricultural Society		150 13 1	
				150 13 1
	EXAMINATION FOR NATIONAL DIPLOMA IN DAIRYING:—			
44	Hire of Premises and Appliances for Examination		40 8 4	
45	Fees to Examiners		48 6 0	
21	Hotel and Travelling Expenses		14 9 0	
3	Printing		4 6 5	
[illegible]	Advertising Examination		19 0 6	
123			126 10 3	
4	Less: Deposits forfeited		2 0 0	
119				124 10 3
	SPECIAL EXPENSES:—			
—	Permanent Site, Preliminary Expenses			38 15 4
—	Paris Exhibition, Exhibits, and Travelling			116 2 10
£9,819	Total Expenditure			£9,806 2 0

Examined, audited, and found correct, this 26th day of March, 1901.

HENRY GRINLING } *Auditors on behalf of the Society.*
JONAS M. WEBB }

(*B*) STATEMENT OF RECEIPTS AND EXPEN-

Receipts.

Corresponding figures for 1899		£ s. d.	£ s. d.
	SUBSCRIPTION:—		
£2 000	From York Local Committee		2,000 0 0
	FEES FOR ENTRY OF IMPLEMENTS:—		
4,271	Implement Exhibitors' Payments for Shedding	5,074 11 0	
183	Non-Members' Fees for Entry of Implements	181 0 0	
52	Fees for Entry of "New Implements".	53 0 0	
4,506			5,308 11 0
	FEES FOR ENTRY OF LIVE STOCK:—		
768	By Members:—1,379 Entries @ 10*s*..	689 10 0	
—	13 „ @ 2*s*. 6*d*..	1 12 6	
68	122 Post Entries @ 15*s*.	91 10 0	
57	64 Late „ @ 1*l*.	64 0 0	
10	30 Substituted Entries @ 5*s*.	7 10 0	
182	By Non Members:—320 Entries @ 1*l*.	320 0 0	
—	20 „ @ 5*s*.	5 0 0	
25	52 Post Entries @ 30*s*.	78 0 0	
24	22 Late „ @ 2*l*.	44 0 0	
2	5 Substituted Entries @ 10*s*.	2 10 0	
512	Fees for Horse Boxes and Stalls	773 10 0	
1,048			2,077 2 6
	FEES FOR ENTRY OF POULTRY:—		
17	By Members:—154 Entries @ 2*s*. 6*d*..	19 5 0	
3	6 Post Entries @ 5*s*.	1 10 0	
114	By Non-members:—414 Entries @ 5*s*.	103 10 0	
8	17 Post Entries @ 10*s*..	8 10 0	
3	Entries of Table Poultry	2 8 0	
145			135 3 0
	OTHER ENTRY FEES:—		
79	Fees for Entry of Produce		84 10 0
15	Fees for Entries in Horse-shoeing Competition		16 5 0
—	Deposit in Competition Forfeited		5 0 0
	CATALOGUE:—		
26	Extra Lines for particulars of Implement Exhibits	19 13 0	
9	Woodcuts of New Implements.	8 6 3	
195	Advertisements in Catalogue	173 9 5	
230			201 8 8
34	Sales of Implement Section of Catalogue (including bound copies).	34 8 9	
303	Sales of Combined Catalogue	599 6 6	
23	„ „ „ (bound copies) @ 2*s*. 6*d*. . . .	16 10 0	
11	Catalogues sold after Show, &c.	4 12 3	
371		654 17 6	
43	Less Commission on Sales in Showyard	56 3 0	
328			598 14 6
	MISCELLANEOUS RECEIPTS—		
138	Fines for Non-Exhibition of Live Stock, &c.		116 0 0
£9,091			
	Carried forward		£10,542 14 8

Expenditure.

Corresponding figures for 1899			£ s. d.	£ s. d.
	COST OF ERECTION OF SHOWYARD:—			
£6,077	Timber		7,252 16 1	
108	Ironmongery		118 18 9	
68	Paints, Oil, Glass, Lead, &c.		63 11 2	
48	Bricks, Lime, Cement, and Coal		43 9 3	
1,067	Hire of Canvas		1,255 14 7	
226	Roofing Cloth, Felt, &c.		290 10 5	
968	Railway Charges, 831*l.* 13*s.*; Horse Hire, 130*l.* 12*s.* 2*d.*		962 5 2	
46	Insurance		40 14 1	
67	Stationery, Postage, and Telegrams		66 1 11	
2	Hire of Furniture, &c.		2 18 3	
3,202	Wages		2,847 3 0	
655	Superintendent's Salary and Expenses		486 9 5	
	COST OF WATER PIPING:			
138	Proportion of original cost of Water Pipes, &c. (865*l.* 16*s* 3*d.*), debited to York Meeting		108 12 10	
315	Cost of Labour and Superintendence in laying down and taking up Pipes		358 5 0	
13,048			13,897 9 11	
	Less:—			
3,652	Sale of Materials	£4,200 11 1		
1,489	Work for Exhibitors and Purveyors	1,437 14 11		
			5,638 6 0	
5,141				8,259 3 11
7,907	**EXPENSES AT HEAD OFFICE IN LONDON:—**			
45	Expenses of Inspection Committee		19 10 3	
1,071	Assistant Director's Salary and Proportion of Salaries of Ordinary Clerical Staff debited to Show Account		1,044 5 0	
13	Assistant Director's Journeys to York and Expenses		16 17 3	
74	Extra Clerical Assistance		247 0 4	
				1,327 12 10
1,203	**PRINTING:—**			
449	Printing of Prize Sheets, Certificates, Admission Orders, Parchment Numbers, Circulars to Exhibitors, Prize Cards, Members' Tickets, and Miscellaneous		356 17 2	
1	Secretary's Local Printing		5 3 2	
50	Programmes for Members		53 14 7	
37	Plans of Showyard		38 4 0	
525	Printing of Catalogues		526 7 5	
37	Binding of Catalogues		63 2 0	
14	Carriage of Catalogues to Showyard		25 18 10	
61	Printing Awards		47 4 0	
				1,216 6 2
1,174	**ADVERTISING, BILL POSTING, AND PLACARDING:—**			
709	Advertising Closing of Entries in Newspapers		88 13 3	
	Advertising Show in Newspapers		150 13 5	
	Contract for Bill Posting and Placarding		440 0 0	
	Printing of Posters and Placards		271 5 0	
				950 11 8
	POSTAGE, CARRIAGE, &C.:—			
125	General Postage, &c., 88*l.* 3*s.* 10*d.*; Postage of Tickets to Members, 40*l.* 17*s.* 8*d.*; Carriage, 13*l.* 7*s.* 7*d.*			142 9 1
4,791	**AMOUNT OF PRIZES AWARDED** (for details see page xviii)			4,495 13 6
	COST OF FORAGE FOR LIVE STOCK:—			
674	Hay, 224*l.* 6*s.* 4*d.*; Straw, 363*l.* 13*s.* 4*d.*; Green Food, 132*l.* 6*s.* 6*d.*; Miscellaneous Expenses, 3*l.* 17*s.*			724 3 2
£16,585	Carried forward			£17,116 0 4

Receipts (*contd.*)

Corresponding figures for 1899		£ s. d.	£ s. d.
£9,091	Brought forward		10,542 14 8
25	Amounts received from Refreshment Contractors		25 0
53	Premium for Cloak Room, &c		52 10
	ADMISSIONS TO SHOWYARD:—		
22	Saturday, June 16, @ 2*s.* 6*d.*	19 12 6	
263	Monday, June 18, @ 5*s.*	558 4 11	
1,118	Tuesday, June 19, @ 2*s.* 6*d.*	1,348 11 6	
1,064	Wednesday, June 20, @ 2*s.* 6*d.*	1,503 14 0	
1,629	Thursday, June 21, @ 1*s.*	2,530 16 4	
639	Friday, June 22, @ 1*s.*	442 8 8	
205	Day Tickets	77 11 0	
97	Season Tickets	113 6 6	
5,037			6,594 5 5
	ENTRANCES TO HORSE RING:—		
25	Monday, June 18	79 18 0	
214	Tuesday, June 19	338 16 0	
101	Wednesday, June 20	151 3 0	
113	Thursday, June 21	215 12 0	
22	Friday, June 22	15 15 0	
475			801 4 0
	DAIRY:—		
10	Receipts at Stand at Dairy	13 7 0	
56	Sales of Produce at Dairy	53 17 5	
66			67 4 5

PRIZES AWARDED:—

			£ s. d.
3,418	Horses, 2,402*l.*; Cattle, 1,725*l.*		4,127 0 0
1,730	Sheep		1,406 0 0
245	Poultry		246 5 0
184	Cheese, 130*l.*; Butter, 59*l.*		189 0 0
40	Cider and Perry		40 0 0
210 18 32	Horse-shoeing		32 0 0
100	Implements		130 0 0
6	Silver Medals for New Implements		5 8 6
40	Contribution to Bee Department		40 0 0
6,018			6,215 13 6
	Less:—		
1,110	Prizes given by Local Committee	£1,534 0 0	
117	" " Various Societies	186 0 0	
1,227			1,720 0 0
			£4,495 13 6
4,791			

		£ s. d.
6,382	Balance to Debit of York Meeting	3,464 17 8
£21,133		£21,547 16 2

ERNEST CLARKE, *Secretary.*

WELTON, JONES & CO., *Accountants.*

Expenditure (*contd.*)

Corresponding figures for 1899		£	s.	d.	£	s.	d.
£16,585	Brought forward				17,116	0	4
	JUDGES' FEES AND EXPENSES:—						
892	Judges of Miscellaneous Implements, 25*l*. 11*s*.; Ditto for Lodgings, 11*l*.	36	11	0			
	Judges of Cultivators and Steam Diggers	51	3	6			
	Judges of Milking Machines	6	6	0			
	Judges of Sheep-shearing Machines	8	6	6			
	Judges of Horses, 159*l*. 4*s*. 1*d*.; Cattle, 226*l*. 13*s*. 2*d*.; Sheep, 241*l*. 4*s*. 11*d*.; Poultry, 37*l*. 15*s*. 9*d*.; Butter, 15*l*. 19*s*.; Cheese, 15*l*. 15*s*. 3*d*.; Cider and Perry, 16*l*. 16*s*. 7*d*.; Horse-shoeing, 17*l*. 3*s*. 10*d*.; Ditto for Lodgings, 11*l*. 10*s*.	742	2	7			
					844	9	7
39	Badges for Judges and other Officials				26	12	0
30	Rosettes				38	5	6
	EXPENSES OF ADMINISTRATION:—						
275	*Stewards*:—Housekeeping Expenses, 181*l*. 17*s*.; Personal and Railway Expenses, 48*l*. 6*s*. 7*d*.	230	3	7			
174	*Assistant Stewards*:—Honoraria, 89*l*.; Railway Expenses, 19*l*. 18*s*. 10*d*.; Lodgings, 57*l*. 15*s*.	166	13	10			
99	*Official Staff*:—Houses, 41*l*; Maintenance of Clerks, 55*l*.; Travelling Expenses, &c., 19*l*. 9*s*. 1*d*.; Secretary's Personal Expenses, 3*l*. 8*s*.	118	17	1			
91	*Finance Office*:—Superintendent of Turnstiles, 20*l*. 2*s*.; Money Takers, 62*l*. 8*s*. 6*d*.; Bank Clerks, 19*l*. 5*s*.	101	15	6			
48	*Awards Office*:—Clerks, 23*l*. 2*s*.; Award Boys, 12*l*. 8*s*. 4*d*.	35	10	4			
687					653	0	0
	General Management:—						
177	Foreman and Assistant Foremen	134	6	2			
383	Yardmen, Grooms, and Foddermen	408	8	5			
74	Door and Gate Keepers	80	16	9			
214	Carriage Hire, 90*l*. 14*s*.; Horse Hire, 62*l*. 7*s*. 9*d*.	153	1	9			
848					76	13	1
138	*Veterinary Department*:—Veterinary Inspectors, 154*l*. 1*s*. 6*d*.; Lodgings, 5*l*. 15*s*.; Hire of Stables for Sick Horses, 4*l*.	163	16	6			
287	*Engineering Department*:—Consulting Engineer and Assistants, 198*l*. 19*s*. 8*d*.; Carriage, 16*l*. 16*s*.; Repairs and Maintenance of Machinery, 50*l*. 11*s*. 6*d*.; Wages to Workmen, 14*l*. 19*s*. 4*d*.	281	6	6			
637	*Police, &c.*:—Metropolitan Police, 683*l*. 1*s*. 4*d*.; Commissionaires, 55*l*. 9*s*. 6*d*.	738	10	10			
1,062					1,183	13	10
14 304	*Dairy*:—Milk, 35*l*. 1*s*. 1*d*.; Ice, 27*l*. 10*s*.; Dairy Staff, 121*l*. 17*s*. 6*d*.; Salt, 1*l*. 7*s*.; Utensils, 73*l*. 6*s*. 5*d*.; Coal, 2*l*. 4*s*. 7*d*.; Carriage, 8*s*. 4*d*.				261	9	11
62	*Poultry*:—Penning, Attendants and Food, 15*l*. 14*s*. 6*d*.; Poultry Killing, 1*l*. 15*s*. 8*d*.; Purchase of Dead Poultry, 2*l*. 5*s*. 9*d*.; Carriage of Poultry to and from Showyard, 9*l*. 4*s*. 6*d*.				29	0	5
22	*Horse-shoeing*:—Hire of Forges, 18*l*. 6*s*. 7*d*.; Coal, 2*l*. 8*s*. 7*d*.; Ironmongery, 2*l*. 12*s*. 6*d*.; Wages and Gratuities, 4*l*. 10*s*. 7*d*.				27	18	3
	GENERAL SHOWYARD EXPENSES:—						
112	Military Band	105	0	0			
50	St. John Ambulance Association	50	0	0			
88	Royal and Official Luncheons	48	10	6			
12	Gratuities to Bath Chairmen	15	0	0			
228	*Hire*.—Furniture, Canvas, &c., 49*l*. 13*s*. 2*d*.; Chairs, 40*l*. 11*s*. 6*d*.; Tumbler Carts, 25*l*.	115	4	8			
45	*Miscellaneous*:—Tan, 11*l*. 10*s*. 4*d*.; Telegraph Extension, &c., 19*l* 14*s*. 6*d*.; Newspapers, 1*l*. 7*s*. 11*d*.; Ironmongery, 1*l* 15*s*. 2*d*.; Coal, 3*l*. 14*s*. 1*d*.; Carriage and Cartage, 21*l*. 8*s*. 11*d*.; Cutting Grass, 13*l*. 15*s*.; Net Expenses of Zebra Hybrid Exhibits, 7*l*. 19*s*. 8*d*.; Floral Decorations, 12*l*. 12*s*.; Various Payments by Secretary, 8*l*. 12*s*. 3*d*.; Ditto by Superintendent, 20*l*. 8*s*. 11*d*.	122	18	9			
582					457	1	11
6	**EXPENSES OF IMPLEMENT TRIALS**				132	19	0
£21,133	Total Expenditure				£21,547	16	2

Examined, audited, and found correct, this 3rd day of December, 1900.

A. H. JOHNSON
HENRY GRINLING
JONAS M. WEBB } *Auditors on behalf of the Society.*

TABLE SHOWING THE NUMBER OF GOVERNORS AND MEMBERS IN EACH YEAR FROM THE ESTABLISHMENT OF THE SOCIETY.

Year ending with Show of	President of the Year	Governors		Members			Total
		Life	Annual	Life	Annual	Honorary	
1839	3rd Earl Spencer	—	—	—	—	—	1,100
1840	5th Duke of Richmond . . .	86	189	146	2,434	5	2,860
1841	Mr. Philip Pusey	91	219	231	4,047	7	4,595
1842	Mr. Henry Handley	101	211	328	5,194	15	5,849
1843	4th Earl of Hardwicke . . .	94	209	429	6,155	15	6,902
1844	3rd Earl Spencer	95	214	442	6,161	15	6,927
1845	5th Duke of Richmond . . .	94	198	527	5,899	15	6,733
1846	1st Viscount Portman . . .	92	201	554	6,105	19	6,971
1847	6th Earl of Egmont	91	195	607	5,478	20	6,391
1848	2nd Earl of Yarborough . . .	93	186	648	5,387	21	6,335
1849	3rd Earl of Chichester . . .	89	178	582	4,643	20	5,512
1850	4th Marquis of Downshire . .	90	169	627	4,356	19	5,261
1851	5th Duke of Richmond . . .	91	162	674	4,175	19	5,121
1852	2nd Earl of Ducie	93	156	711	4,002	19	4,981
1853	2nd Lord Ashburton	90	147	739	3,928	19	4,923
1854	Mr. Philip Pusey	88	146	771	4,152	20	5,177
1855	Mr. William Miles, M.P. . .	89	141	795	3,838	19	4,882
1856	1st Viscount Portman . . .	85	139	839	3,896	20	4,979
1857	Viscount Ossington	83	137	896	3,933	19	5,068
1858	6th Lord Berners	81	133	904	4,010	18	5,146
1859	7th Duke of Marlborough . .	78	130	927	4,008	18	5,161
1860	5th Lord Walsingham . . .	72	119	927	4,047	18	5,183
1861	4th Earl of Powis	84	90	1,113	3,328	18	4,633
1862	H.R.H. The Prince Consort 1st Viscount Portman . .	83	97	1,151	3,475	17	4,823
1863	Viscount Eversley	80	88	1,263	3,735	17	5,183
1864	2nd Lord Feversham	78	45	1,343	4,013	17	5,496
1865	Sir E. C. Kerrison, Bart., M.P.	79	81	1,386	4,190	16	5,752
1866	1st Lord Tredegar	79	84	1,395	4,049	15	5,622
1867	Mr. H. S. Thompson	77	82	1,388	3,903	15	5,465
1868	Duke of Richmond	75	74	1,409	3,888	15	5,461
1869	H.R.H. The Prince of Wales, K.G.	75	73	1,417	3,864	17	5,446
1870	7th Duke of Devonshire . . .	74	74	1,511	3,764	15	5,438
1871	6th Lord Vernon	72	74	1,589	3,896	17	5,648
1872	Sir W. W. Wynn, Bart., M.P. .	71	73	1,655	3,953	14	5,766
1873	Earl Cathcart	74	62	1,832	3,936	12	5,916
1874	Mr. Edward Holland	76	58	1,944	3,756	12	5,846
1875	Viscount Bridport	79	79	2,058	3,918	11	6,145
1876	2nd Lord Chesham	83	78	2,164	4,013	11	6,349
1877	Lord Skelmersdale	81	76	2,239	4,073	17	6,486
1878	Col. Kingscote, C.B., M.P. . .	81	72	2,328	4,130	26	6,637
1879	H.R.H. The Prince of Wales, K.G	81	72	2,453	4,700	26	7,332
1880	9th Duke of Bedford	83	70	2,673	5,083	20	7,929
1881	Mr. William Wells	85	69	2,765	5,041	19	7,979
1882	Mr. John Dent Dent	82	71	2,849	5,059	19	8,080
1883	Duke of Richmond and Gordon	78	71	2,979	4,952	19	8,099
1884	Sir Brandreth Gibbs	72	72	3,203	5,408	21	8,776
1885	Sir M. Lopes, Bart, M.P. . .	71	69	3,356	5,619	20	9,135
1886	H.R.H. The Prince of Wales, K.G.	70	61	3,414	5,569	20	9,134
1887	Lord Egerton of Tatton . . .	71	64	3,440	5,387	20	8,982
1888	Sir W. M. Ridley, Bart., M.P. .	66	56	3,521	5,225	16	8,884
1889	HER MAJESTY QUEEN VICTORIA	73	58	3,567	7,153	15	10,866
1890	Lord Moreton	122	58	3,846	6,941	17	10,984
1891	Earl of Ravensworth	117	60	3,811	6,921	19	10,928
1892	Earl of Feversham	111	69	3,784	7,066	20	11,050
1893	1st Duke of Westminster, K.G.	107	74	3,786	7,138	21	11,126
1894	Duke of Devonshire, K.G. . .	113	73	3,798	7,212	22	11,218
1895	Sir J. H. Thorold, Bart. . . .	120	80	3,747	7,179	23	11,149
1896	Sir Walter Gilbey, Bart. . .	126	83	3,695	7,253	23	11,180
1897	H.R.H. The Duke of York, K.G.	126	83	3,705	7,285	24	11,223
1898	Earl Spencer, K.G.	121	79	3,687	7,182	25	11,094
1899	Earl of Coventry	116	75	3,656	7,090	23	10,879
1900	H.R.H. The Prince of Wales, K.G.	111	71	3,628	6,832	24	10,666
1901	Earl Cawdor	102	70	3,564	6,270	27	10,033
1901 (Dec.)	H.R.H. Prince Christian of Schleswig-Holstein, K.G.	103	70	3,564	6,289	28	10,054

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Proceedings of the Council.

WEDNESDAY, FEBRUARY 6, 1901

EARL CAWDOR (PRESIDENT) IN THE CHAIR.

Present:

Trustees.—Sir Walter Gilbey, Bart., Colonel Sir Nigel Kingscote, K.C.B., Viscount Ridley.

Vice-Presidents.—The Right Hon. Sir Massey Lopes, Bart., Lord Moreton, the Hon. Cecil T. Parker, Sir Jacob Wilson.

Other Members of Council.—Mr. Alfred Ashworth, Mr. R. C. Assheton, Viscount Baring, Mr. George Blake, Mr. J. Bowen-Jones, Mr. Victor C. W. Cavendish, M.P., Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Colonel J. F. Curtis-Hayward, Mr. A. E. W. Darby, Mr. J. Marshall Dugdale, Mr. W. Frankish, Mr. R. M. Greaves, Mr. R. Neville Grenville, Mr. James Hornsby, the Earl of Jersey, G.C.B., Captain W. S. B. Levett, Mr. Joseph Martin, Mr. T. H. Miller, Mr. P. A. Muntz, M.P., Mr. W. A. Prout, Mr. J. E. Ransome, Mr. Frederick Reynard, Mr. C. C. Rogers, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr. Alfred J. Smith, Mr. R. Stratton, Mr. Garrett Taylor, Mr. Joseph P. Terry, Mr. E. V. V. Wheeler, Mr. C. W. Wilson.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton-Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard.

Professor McFadyean, Mr. A. C. Cope, Mr. Harold Swithinbank.

The following members of the Cardiff Local Committee were also present:—The Mayor of Cardiff (Mr. Alderman Andrews), Mr. D. T. Alexander, Mr. E. W. M. Corbett, Mr. Robert Forrest, Mr. G. C. Williams, and Mr. J. L. Wheatley (Town Clerk).

Apologies for non-attendance on account of other duties or of illness were received from the Duke of Richmond and Gordon, K.G., the Marquis of Granby, the Earl of Coventry, the Earl of Derby, K.G., the Earl of Feversham, Earl Spencer, K.G., Lord Arthur Cecil, Lord Brougham and Vaux, Lord Middleton, Sir John H. Thorold, Bart., Mr. J. H. Arkwright, Mr. H. Chandos-Pole-Gell, Mr. S. P. Foster, Mr. Hugh Gorringe, Mr. John Howard Howard, Mr. C. S. Mainwaring, Mr. Henry D. Marshall, Mr. Albert Pell, Mr. Henry Smith, Mr. E. W. Stanyforth, Mr. Martin J. Sutton, Mr. R. A. Warren, Mr. Charles Whitehead.

Address of Condolence with His Majesty the King.

Immediately after the confirmation of the minutes of the last meeting, held on December 12, 1900,

The PRESIDENT rose (all the members standing) to propose an Address of Condolence with His Majesty the King on the death of Her late Majesty Queen Victoria. He said that it devolved upon him that day to perform one of the saddest duties which had ever fallen to the lot of the occupant of that Chair.

They met under the shadow of a deep and universal sorrow. They mourned a great Queen, a great and wise ruler, and a great personality that had made itself felt in every part of the world. But while they mourned, they remembered with respectful gratitude what the Queen had been to them and what she had done for the country. They looked back with thankfulness and love for all the sympathy which she had shown to her people in their sorrows and in their joys.

The agricultural community of this country owed a deep debt of gratitude to Her late Majesty the Queen for the interest that she had ever shown in the welfare of their Society, and of agriculture in general. The English Agricultural Society which they now represented was established in the very early days of Her Majesty's reign, and received from Her Majesty her gracious patronage and that Royal Charter, dating back to 1840, which gave the Society its present title.

Her Majesty was not only the Patron of the Society for no less than sixty-one years, but on the fiftieth anniversary of the Society's existence Her Majesty became its President for the Meeting which, as most of those present would so well remember, was held at Windsor in 1889. He thought, therefore, that as members of the Royal Agricultural Society they would all feel that the great loss which had just afflicted the nation was to them a personal one.

His Majesty the King had, as the Prince of Wales, endeared himself to them all by the keen personal interest he had ever taken in all that related to the welfare of the agricultural interests of the country at large, and especially of the Royal Agricultural Society. They had made many and many calls upon his time and thoughts. On no less than four occasions had His Majesty condescended to be the President of their Society: at Manchester in 1869, at Kilburn in 1879, at Norwich in 1886, and at York in 1900; in addition to which, at the great Windsor Show, he had undertaken the active duties of the Presidency under Her late Majesty the Queen. His Majesty's Presidential duties on those occasions were no sinecure, as they well knew the interest he took in the detailed administration of the Society. Only last year His Majesty had reminded them in the York showyard that he had been associated with the Society for no less a time than thirty-six years, and was pleased to say that he took the greatest possible interest in its welfare.

High duties of State must of course monopolise the time of the King in future; but he thought they might venture to hope that His Majesty might still find relaxation from the cares of the Empire in the agricultural pursuits in which he had always been so much interested, and with which he had so closely identified himself in the past. He (Lord Cawdor) was sure that every member of the Society would join most heartily and earnestly in the expression of the hope that His Majesty the King might be given health and strength for many years to fulfil the high duties of the position to which he had been called.

At the request of the PRESIDENT, Sir ERNEST CLARKE then read the terms of the Address, which was ordered to be sealed with the Society's seal and forwarded to the Secretary of State for the Home Department, for humble submission to His Majesty the King.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

TO THE KING'S MOST EXCELLENT MAJESTY.

May it please Your Majesty:

We, the President and Council representing the general body of Governors and Members of the Royal Agricultural Society of England, beg leave humbly to approach Your Majesty with the assurance of our earnest and respectful sympathy with Your Majesty in the grievous loss which the Royal Family have sustained by the death of our beloved Sovereign, Her late Majesty Queen Victoria, and of our heartfelt sorrow at the sad event which has plunged the whole of the British Empire into mourning.

The Society desires to pay a respectful tribute of loyal and sincere respect to the memory of a Sovereign who, throughout Her long and glorious reign, was unremitting in Her devotion to the manifold duties of Her exalted station, and who endeared Herself to all Her subjects by Her constant sympathy with both their joys and sorrows.

The formation of the Royal Agricultural Society of England was almost coincident with the accession of Her Majesty the Queen to the Throne, and we recall with feelings of pride and gratification that Her late Majesty had been Patron of the Society for the long period of sixty-one years, and honoured the Society by graciously accepting its Presidency in the fiftieth year of its existence.

No class of the community is more devotedly attached to the Throne than the agriculturists of England; and on their behalf we desire to express our grateful recognition of the many important benefits that have accrued to the agriculture of this country from the keen personal interest which Her late Majesty and the Royal Family have ever evinced in the welfare of this Society and of agriculture in general.

The Society has received so many marks of Your Majesty's favour in the prosecution of the national work for the general advancement of English agriculture imposed upon it by the Charter granted to the Society by Her late Majesty in 1840, that it ventures to hope that it may still continue to merit Your Majesty's patronage in the future.

In expressing on behalf of the agricultural community at large its feelings of profound loyalty and attachment to Your Majesty's Throne and Person, we earnestly pray that the Almighty may vouchsafe to Your Majesty health and strength to guide for many years to come the destinies of the Empire over which Your Majesty has now been called to reign.

(L. S.)

Given under the Common Seal of the Royal Agricultural Society of England, this sixth day of February 1901.

Signed
Cawdor, President.
Nigel Kingscote, Trustee.
Ernest Clarke, Secretary.

At a later stage of the proceedings, The President said that a letter had been addressed to him by the Royal Central Agricultural Association of Portugal, conveying the sincere condolences of that Society with the Royal Agricultural Society at the sad event which had plunged the British Empire into mourning. The letter added that the death of Her Majesty Queen Victoria represented for Portugal not only the loss of the head of the State of a friendly and allied nation, but also the end of a glorious reign, during which had been witnessed the development in the government of a country of the best examples of good and patriotic administration. In sharing the mourning of the Royal Agricultural Society of England, the Royal Portuguese Association expressed the most sincere wishes for the prosperity of the United Kingdom under the sway of His Majesty King Edward VII.

Lord CAWDOR said that it would no doubt be the wish of the Council that he should on their behalf write a letter of cordial thanks in appreciation of this kindly and graceful act by a sister national society. He might add that in view of the presence in this country of His Majesty the King of Portugal, he (the President) had thought it right to forward a copy of the Portuguese Society's letter to Lord Denbigh, who was in attendance at Buckingham Palace on the King of Portugal. He had since received a reply from Lord Denbigh stating that the letter had been submitted to the King, and that he had His Majesty's commands to state that it met with His Majesty's entire approval, and had afforded him much satisfaction.

Election of New Members.

The election of the following twenty-two members was then proceeded with:—

BAKER, Sir R. L., Bart... Ranston, Blandford.
*BEALE, Capt. W. St. John.. Bucknell, Salop.
BELL. John.. The Hall, Thirsk, Yorks.
BENNETT, A. O. T... Gately Hall, Dereham.
BENNETT, H... Summer Hill, Pendleton.
BENNETT, J... Summer Hill, Pendleton.
BERNARD. F. T. H... Chearsley, Aylesbury.
BOUWEN, Lieut.-Col. L. H... Hemel Hempstead.
BROOME, A... Preston Brook, Warrington.
BROWN, A. M... The Avenue, Lincoln.
CROKAT, C. F... Carylls Lea, Fay Gate, Horsham.
FORSHAW, T... Scotfield, Carlton-on-Trent.
GOODMAN, P... 24 and 26, Basinghall St., E.C.
HARDEBECK. C... Poulhurst, Brenchley, Kent.
HAYNES, H... South Heath, Hampstead, N W.
LEWIS, H... Green Meadow, Tongwynlais, Cardiff.
MONTEFIORE, Rev. D. B... Mursley, Winslow.
PHILLIPS, O... Bredon Lodge, Tewkesbury.
SUMNER, H... 20, Hatton Garden, Liverpool.
TIMARU Agricultural and Pastoral Association ... Timaru, New Zealand.
WELLINGTON, Duke of.. Apsley House, W.
WILLIAMS, R. H... Roath Court, Cardiff.

* Re-instated under Bye-law 12.

New Member of Council.

In the unavoidable absence of Sir John Thorold (Chairman of the Committee of Selection), Sir NIGEL KINGSCOTE formally introduced Mr. W. A. Prout, of Sawbridgeworth, Herts, who attended the Council for the first time.

The Reports of the various Standing Committees were then presented and adopted as below:—

Finance.

Sir NIGEL KINGSCOTE reported his election as Chairman of the year. The accounts for the month ended December 31, 1900, as certified by the Society's Accountants, showed total receipts amounting to 2,583*l.* 6*s.* 1*d.*, and expenditure amounting to 2,610*l.* 18*s.* 9*d.* The accounts for the period ended January 30, 1901, which were also presented, showed total receipts amounting to 5,583*l.* 7*s.* 4*d.*, and expenditure amounting to 901*l.* 18*s.* 1*d.* In addition, the Committee had repaid the loan of 5,000*l.* contracted with the Society's Bankers in August last, as authorised by the Council on August 1, 1900, though it would, of course, be necessary later on in the season either to renew the loan or to sell Consols to provide for the expenses of the Cardiff Meeting. Accounts amounting in all to 929*l.* 15*s.* 2*d.* had been passed, and were recommended for payment.

In connection with the preparation of a new Register of Members of the Society, the Committee were now engaged in a thorough revision of the present List, with the view of removing from the register those members who for various causes had ceased to pay their subscriptions. A letter had been received from a member expressing his opinion that the annual subscribers receive more than the value of their 1*l.* contribution, and stating his willingness to double his subscriptions, feeling sure that many others would willingly do the same. The Committee recommended that this offer of an increased subscription be accepted with thanks.

House.

Sir NIGEL KINGSCOTE reported his election as Chairman of the year. Various accounts connected with the House had been passed for payment.

Journal.

The Earl of JERSEY reported that Sir John Thorold had been elected

Chairman of the year. The fourth quarterly part of the Journal for 1900 had been published and duly issued to the members. The Committee had discussed various other matters connected with the future of the Journal, on which they would report at a later date.

Chemical and Woburn.

The Hon. C. T. Parker reported the election of Mr. E. W. Stanyforth as Chairman of the year. Dr. Voelcker had reported the progress of the Field and Feeding Experiments at Woburn, and the Committee had given detailed consideration to several matters connected with the Experimental Farm and the Pot Culture Station. Dr. Voelcker had presented a report on cases of adulteration which had recently been brought under his notice as Consulting Chemist to the Society, and which was now submitted to the Council.

After some discussion, the following cases were ordered to be printed in the Proceedings:—

I.—Unreliability of Analytical Reports on Cakes unless Guaranteed to Apply to the Particular Purchase.

A member of the Society sent in November, 1900, for analysis a sample of linseed cake, the price charged for which was 8*l.* 17*s.* 6*d.* per ton. Dr. Voelcker reported:—

> "This is not a satisfactory cake, containing too much weed seed (rape chiefly), starchy impurity, and sand (1·79 per cent.). I consider it decidedly dear."

The vendors said there must be some mistake about Dr. Voelcker's analysis, and enclosed a copy of an analysis by a Hull analytical chemist, which they said was "of our last, the cake is exceptionally good, and why yours should be different we are at a loss to see." The report read, "This is a 95 per cent. pure linseed cake, rich in oil." The percentage of oil stated was 13·16, whereas Dr. Voelcker's analysis gave only 10·19 per cent. Dr. Voelcker remarked that the copy of analysis put in bore no date, and that there was nothing to identify it as referring to the delivery from which the particular purchase in question was made. Ultimately a sample was taken by the vendors from the actual delivery, and the vendors wrote to the purchaser on January 11, 1901:—

> "*Re Linseed Cake Analyses.*
>
> "We have thoroughly gone into this matter, and had cakes drawn from your farm analysed by another analyst, and we regret very much to say that they have not come out as they should—95 per cent. purity—and your complaint is quite justified. We do not make these cakes ourselves, but they are manufactured for us by two firms in the North of England on big contracts, guaranteed up to a certain analysis, viz., 95 per cent. purity and 11 / 12 per cent. oil, which as everyone knows is a high standard of purity.
>
> "From time to time we have them analysed, to see that our customers and ourselves are getting value for money, and we are pleased to say that only on one occasion before have we had reason to complain. The reason given by the manufacturers is that the men have allowed the bins to run too low, and this particular lot has got all the admixture which settles on the bottom of the bins after a night's work, which, if correct, is nothing but carelessness.
>
> "We shall be pleased to make this matter right with you by an allowance, and would suggest 15*s.* per ton, which we think is about the difference in the value of cake which you should have had and what you have had delivered to you. We also wish to tender our very best thanks to you for having had the cakes analysed, and so brought the matter to light, which we will see never occurs again."

In the end an allowance of 22*s.* 6*d.* per ton was given. Dr. Voelcker, in reply, wrote on January 16, 1901:—

> "I am obliged to you for letting me know further about the cake. And it is satisfactory to me to know that the vendors, after asserting that the cake was exceptionally good, now allow that my strictures on it were fully justified.
>
> "This case shows you how little one can trust to analyses put out by vendors, and purporting to be that of a particular delivery, unless one obtains from them a definite guarantee that the cake actually being purchased is up to the quality set out. I am afraid I cannot quite follow the explanation given as to the cause of occurrence of the impurities. I reported weed seeds—rape chiefly—in abundance. I can understand *sand* settling out to the bottom of a bin, but I have yet to learn that rape and other weed seeds do so separate themselves out from linseed and collect more at the bottom of a vessel."

II.—Excessive Sand in Linseed Cake.

A member of the Society sent early in January, 1901, a sample of linseed cake for analysis. This was found to contain

Sand . . . . . 3·72 per cent.

It turned out that the cake had been offered to the member at 9*l.* per ton as "pure," but, wisely sending a sample for analysis before purchasing, the member declined to make the purchase.

Botanical and Zoological.

Mr. Wheeler reported his election as Chairman of the year. The Committee had considered the re-issue of certain of the Insect Diagrams published by the Society, which were now out of print, and had agreed upon a regrouping of the Diagrams. The Consulting Botanist had presented a report on a serious disease in the Cherry Orchards of

Kent, which it was recommended should be circulated as a leaflet and afterwards printed in the Journal. (see page 241).

Veterinary.

The HON. CECIL T. PARKER reported his election as Chairman of the year. The Annual Report for 1901 of the Royal Veterinary College had been laid upon the table, and ordered to be put into type for further consideration. The following report on Contagious Diseases among Animals had been received from Professor McFadyean:—

> ANTHRAX.—During the first four weeks of the present year forty-four outbreaks, with sixty-four animals attacked, have been reported. The corresponding figures for last year were thirty-two and fifty-seven respectively.
>
> FOOT-AND-MOUTH DISEASE.—Since the date of the last Council meeting, outbreaks of this disease were detected in Essex on December 12, 13, 15, and 18, and in Suffolk, near Ipswich, on January 28. During the last few days four other outbreaks have been discovered within a short distance of the last of these, and also a fresh centre in Kent.
>
> SWINE FEVER.—The outbreaks reported for the first four weeks of this year number 132, and during the same period 836 pigs were destroyed as diseased or exposed to infection. The figures for the corresponding period of last year were 142 and 1,716 respectively.
>
> RABIES.—No case of this disease has been reported since the beginning of 1901. The last case detected in the dog occurred during the second week of October last.
>
> MISCELLANEOUS.—During the month of January, 53 morbid specimens were forwarded to the Research Laboratory at the Royal Veterinary College for examination. Some experiments with regard to the effects of metallic poisons have been carried out, and a serious outbreak of contagious mammitis in cows has been under investigation.

Foot-and-Mouth Disease.

SIR NIGEL KINGSCOTE said it would be an advantage if the Council could have some information before them as to the measures which had been taken with the view of stamping out foot-and-mouth disease.

MR. A. C. COPE said that the report of Professor McFadyean contained all the available information as to details of the outbreaks. The great difficulty had been to detect the actual place of origin of the outbreaks of foot-and-mouth disease which had occurred in different districts. What they did know, however, was the manner in which the disease had been spread. Where, for instance, cases of the disease had been discovered upon a farm, it was ascertained that it had actually been in progress for some time before its character was recognised. That, he regretted to say, was one of the reasons for the continued prevalence of the disease—and more particularly when it affected sheep. The Board of Agriculture were of course using every possible means with a view to combat the disease, and as a result it had been most successful in preventing the disease from spreading from the centres where it had first been discovered. They only hoped that they would obtain the cordial co-operation of agriculturists and stock-owners in giving the Board early notice of any suspicious cases of the disease. It was only by doing this that the Board would be able to deal effectively with any cases of the disease which might occur.

MR. J. BOWEN-JONES said he should be glad to know whether any circulars had recently been issued by the Board of Agriculture indicating what the symptoms of foot-and-mouth disease were.

MR. COPE said that the Board of Agriculture had last year had the following handbill giving the symptoms of foot-and-mouth disease printed and freely circulated:—

> FOOT-AND-MOUTH DISEASE.
>
> *Symptoms.*
>
> In the early stages of the disease the animal frequently smacks its lips, and shows by the movement of its tongue that the mouth is the seat of suffering; and the saliva flows freely from the mouth. An examination of the mouth shows the existence of vesicles on the tongue and on the inner part of the upper lip and on the pad. Often the vesicles are broken, exposing a red surface beneath. The animal seldom refuses food, but rolls it about in its mouth, and often drops it instead of swallowing it. In most instances the feet are affected as well as the mouth, and blisters will form between the toes and on the heels between hair and hoof, causing the animal to walk tenderly, and frequently to catch up one foot after the other and shake it as if to dislodge something which was producing pain. In milch cows the teats are occasionally affected with vesicles, especially at the opening of the milk duct, which often leads when in this situation to sores and crusts being formed, preventing the ready flow of the milk. The disease frequently exists simultaneously

among the cattle, sheep, and pigs of the farm.

(Signed) T. H. ELLIOTT, Secretary.
Board of Agriculture,
4, Whitehall Place, London, S.W.:
February, 1900.

NOTE.—All persons owning or having in their charge any animal or animals presenting either of the above symptoms are required by law to give notice to the Police with all practicable speed.

Mr. **BOWEN-JONES** was aware that this had been done, for in his own county the Board's circulars had been supplemented by circulars more simple in character. But he suggested that it would be well that the Board's circular should be again issued, if possible with fewer technical terms in it.

Mr. **TERRY** asked if it was the fact that there were instances in which veterinary surgeons had been attending sheep afflicted with a disease which they did not recognise, but which was afterwards proved to be foot-and-mouth.

Mr. **MARTIN** thought it ought to be brought to the knowledge of the younger members of the veterinary profession what the actual symptoms of the disease were.

Professor **McFADYEAN** said that as a matter of fact he was only aware of one case in which foot-and-mouth disease had not been at once diagnosed. The progress of the disease might certainly be partly due to the inability of the rising generation of veterinary surgeons and stockowners to recognise the symptoms of the disease at once; but it must be remembered that their duty was restricted to observing if the feet or mouths of the animals became affected in any way, and to report to those upon whom the duty devolved of making an inquiry into the disease. The fullest publicity should be given to the fact that stockowners should make immediate report of any symptoms affecting the mouths or feet of any of their animals.

Stock Prizes.

Mr. **SANDAY** reported his election as Chairman of the year. The Welsh heifer "Tremadoc," No. 981, exhibited by Mr. R. M. Greaves in Class 115 at the York Meeting, to which the second prize of 10*l.* had been awarded, had failed to comply with the regulation as to calving. The Committee therefore recommended that the second prize be awarded to the Reserve Number, No. 984, Mr. W. E. Oakeley's "Twill," which had been exhibited in milk. A letter had been received from the Oxford Down Sheep Breeders' Association, offering 12*l.* for additional prizes in the four classes for Oxford Down sheep at Cardiff. The Committee regretted that it was too late to insert additional class prizes in the prize-sheet for the Cardiff Meeting. The Committee had considered the draft regulations framed by a Sub-Committee appointed to draw up a scheme for Jumping Competitions in the Cardiff showyard, and, with some amendments, had approved the draft. The Committee considered it was very desirable that, in view of the restriction of one class of the Jumping Competitions to animals exhibited in Classes 3, 4, and 5 of the Cardiff prize-sheet, all animals entered in these classes should be subject to veterinary examination, and they recommended that a footnote be placed in the prize-sheet under the hunter classes to this effect.

Judges Selection.

Mr. **SANDAY** (Chairman) reported that the Committee had selected the names of gentlemen to be invited to act as judges in the several departments for the Cardiff Meeting, and they recommended the issue of the invitations forthwith. A condition of the appointment was that these gentlemen do not act as judges of the same class of stock at the meeting of either the Bath and West of England Society, or the Royal Counties Agricultural Society, to be held this year.

Implement.

Mr. **FRANKISH** reported his election as Chairman of the year. The Secretary had reported that the Implement Regulations for the Cardiff Meeting had been published and issued, and that most of the invitations to act as Judges of Implements had been accepted by the gentlemen who had been nominated.

General Cardiff.

Sir WALTER GILBEY reported that the Bishop of Llandaff had consented to preach at the Showyard Service on June 30. Regulations for Jumping Competitions and for competitions in the Dairy at Cardiff had been considered by the Committee and passed. The Committee recommended that the usual letter asking for the services of the Metropolitan Police in the showyard be sent to the Chief Commissioner. The names of gentlemen qualified to act as judges of colliery horses and for the timbering and rope-splicing competitions had been submitted and referred to the Judges' Selection Committee. The Committee recommended that the classes for draught horses be opened to mares as well as geldings, that the colliery horses be exhibited for one day only, and that both the draught and colliery horses should be judged on Saturday, June 29.

Showyard Works.

Sir JACOB WILSON reported his election as Chairman of the year. The Superintendent had reported that he had made satisfactory arrangements with regard to the supply of sleepers in the Cardiff showyard. The Committee had considered and recommended for acceptance new contracts with regard to the cloak-rooms at Cardiff, and for laying down and taking up water-mains in the Cardiff showyard.

Selection.

Mr. CRUTCHLEY reported that Sir John Thorold had been elected Chairman of the year. The Committee drew the attention of the Council to their recommendation adopted on May 2, 1900, that the Society's Meeting of 1902 should be held in some town in District G (Lancashire, Cheshire, and North Wales), provided that some suitable and adequate site were offered for the purpose. The Committee had to report that, although due publicity had been given to this intention, no invitation had yet reached the Society from any town in District G. It appeared to them, therefore, that the time had now arrived when the Society's invitation should be thrown open to any other part of England that might be willing to receive the Society in 1902.

A formal resolution to this effect was moved by Mr. CRUTCHLEY, seconded by Sir JACOB WILSON, and carried.

Education.

Lord MORETON reported his election as Chairman of the year. The arrangements had been completed for the second Examination for the National Diploma in Agriculture, to take place at the Yorkshire College, Leeds, on Monday, May 6 next, and following days.

Dairy.

Mr. DUGDALE reported his election as Chairman of the year. The Committee had considered the question of the appointment of Judges for the Produce Department at the Cardiff Meeting, and had recommended the names of gentlemen to act in that capacity.

Miscellaneous.

The SECRETARY read a letter from the British Congress on Tuberculosis, inviting the Society to send Delegates to the Congress to be held at the end of July next.

On the motion of the Hon. CECIL T. PARKER, seconded by Sir NIGEL KINGSCOTE, it was resolved that the Chairman of the Veterinary Committee (Mr. Parker), Sir George Brown, C.B. (Consulting Veterinary Surgeon), Dr. Voelcker (Consulting Chemist), Mr. Harold Swithinbank, and Sir Ernest Clarke (Secretary) be appointed Delegates to attend the Congress.

Other business having been transacted, the Council adjourned until Wednesday, March 6, 1901.

WEDNESDAY, MARCH 6, 1901.

EARL CAWDOR (PRESIDENT) IN THE CHAIR.

Present:

Trustees.—The Duke of Bedford, Sir Walter Gilbey, Bart., Colonel Sir Nigel Kingscote, K.C.B., Viscount Ridley, Earl Spencer, K.G., Sir John Thorold, Bart.

Vice-Presidents.—Mr. H. Chandos-Pole-Gell, the Earl of Feversham, the Right Hon. Sir Massey Lopes, Bart., Lord Moreton, the Hon. Cecil T. Parker, Sir Jacob Wilson.

Other Members of Council.—Mr. J. Bowen-Jones, Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Colonel J. F. Curtis-Hayward, Mr. J. Marshall Dugdale, Mr. S. P. Foster, Mr. Hugh Gorringe, the Marquis of Granby, Mr. R. Neville Grenville, Mr. James Hornsby, Mr. John Howard Howard, Captain W. S. B. Levett, Mr. Henry D. Marshall, Mr. Joseph Martin, Lord Middleton, Mr. W. A. Prout, Mr. J. E. Ransome, Mr. Frederick Reynard, Mr. G. H. Sanday, Mr. Alfred J. Smith, Mr. Henry Smith, Mr. Martin J. Sutton, Mr. Joseph P. Terry, Mr. R. A. Warren, Mr. J. C. Williams, Mr. C. W. Wilson.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. Cecil Warburton, M.A., Zoologist; Mr. J. E. Compton-Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard.

Professor Sir George Brown, C.B.

Mr. D. T. Alexander, Member of the Cardiff Local Committee.

Apologies for non-attendance were read from H.R.H. Prince Christian, K.G., the Earl of Coventry, the Earl of Derby, K.G., Lord Arthur Cecil, Lord Brougham and Vaux, Viscount Baring, Mr. J. H. Arkwright, Mr. Alfred Ashworth, Mr. R. C. Assheton, Mr. George Blake, Mr. W. Frankish, Mr. R. M. Greaves, Mr. Albert Pell, Mr Howard P. Ryland, Mr. E. W. Stanyforth, Mr. E. V. V. Wheeler, and Mr. Charles Whitehead.

At the opening of the proceedings, after the approval of the minutes of the last meeting of the Council on February 6,

The PRESIDENT said that, feeling sure the Council and every member of the Society would ardently desire that His Majesty the King would be pleased to place himself at the head of the Society as its Patron, he had on their behalf approached His Majesty with a humble petition that His Majesty would be graciously pleased to accept the office of Patron. (Hear, hear.) Her late Majesty Queen Victoria, when bestowing upon the Society its Royal Charter in 1840, had placed Herself at its head as Patron of the Society, and from Her Majesty's gracious patronage of sixty-one years had accrued many important benefits to the agriculture of the country in general, and to their Society in particular. His Majesty the King had manifested in the past so deep a personal interest in the welfare of the Society, that he (Lord Cawdor) thought they might venture to hope that His Majesty might deem the Society worthy of a further mark of His Royal favour by accepting the office of its Patron in succession to their late beloved Sovereign.

Earl SPENCER said he felt confident he was expressing the feelings of every member of the Council in cordially endorsing and thanking the President for the action his Lordship had taken in this matter. It would be a great gratification to every member of the Society if His Majesty the King, to whom the Society was already indebted for so many favours, should be pleased to grant their petition, and to accept the office of Patron. (Hear, hear.)

Election of New Governor and Members.

The election of the following Governor and twenty-six members was then proceeded with:—

Governor.

Leconfield, Lord..Petworth House, Sussex.

Members.

Barnard, E. B...Grove Lodge, Sawbridgeworth.
Bose, S. E...Secretary of the Indian Gardening Association, 181, Upper Circular Road, Calcutta.
Carey, W. W...Villa Carey, Cairo.
Coldwell-Horsfall, H. H...Penns Hall, Erdington, Birmingham.
*Darby-Griffith, Capt. C. W...Padworth House, Reading.
De Ledinghen, Gaston A.M...Valembrine, Winville, Pas de Calais, France.
Eve, H. T., K.C...Pullabrook, Bovey Tracey.
Fenwick. W...Low Bradley, Medomsley R.S.O.
Foster, W. F...Homewood, Chislehurst.
Gifford, H...Hubbards Hall, Harlow.
Gilbert, R. T. E...Ashby Hall, Norwich.
Howell, H...Green Farm, Cyntwell, Cardiff.
Howell, J. H...Grove House, Richmond Crest, Cardiff.
*Keeble, H. C...Spread Eagle Hotel, Epsom.
Lane, F. G. A...Bloxworth House, Wareham.
*Musker, R...18, Eaton Avenue, Liscard, Cheshire.
Pemberton, Lt.-Col. A. R...Westmeston Place, Hassocks.
Pratt, C. I...Melton, Woodbridge.
Reader, E. H...Pearson's Green Farm, Brenchley.
Scott, F...Kilkenny, Bibury, Fairford.
*Sharpe, J...Bardney Manor, Lincoln.
Smith, W...The Links, Bishop's Stortford.
Steele, G...Guilsborough Lodge, Northampton.
Symons, G. G...Bramford, Ipswich.
Thompson, M...Southfield Farm, Lintz Green R.S.O., co. Durham.
Todd, N. H...Blythwood, Edgbaston, Birmingham.

* Re-instated under Bye-law 12.

The Reports of the various Standing Committees were then presented and passed as below:—

Finance.

Viscount **Ridley** reported that the accounts for the month of February, 1901, as certified by the Society's Accountants, showed total receipts amounting to 1,266*l*. 13*s*., and expenditure to 645*l*. 18*s*. 5*d*. Accounts amounting in all to 4,007*l*., 1*s*. 9*d*. had been passed, and were recommended for payment. The draft balance-sheet for 1900, and statement of ordinary receipts and expenditure for that year, had been submitted by the Secretary, and ordered to be laid before the Auditors of the Society for their approval (see pages xii–xix).

Journal.

Sir **John Thorold** (Chairman) reported that various accounts for printing and illustrations in connection with the Journal for 1900, had been passed and referred to the Finance Committee for payment. The Committee concurred in the suggestion of the Veterinary Committee as to separate Reprints of the Annual Report of the Principal of the Royal Veterinary College being struck off in pamphlet form for circulation to those specially interested, and to any members of the Society who might express a wish to have a copy sent to them

Chemical and Woburn.

Mr. R. A. **Warren** reported that various matters connected with the Woburn Experimental Farm had been settled. The field and feeding experiments were progressing satisfactorily, and the sheep-feeding experiments were nearly concluded.

The Committee presented for the approval of the Council the following report on a case in which ground rice husks had been sold as "rice meal." After a discussion, in which the Hon. **Cecil Parker**, Mr. **Martin Sutton**, Mr. C. W. **Wilson**, Mr. R. A. **Warren**, and Earl **Spencer** took part, the report was adopted, and ordered to be printed in the Proceedings.

GROUND RICE HUSKS SOLD AS "RICE MEAL."

A member of the Society sent on December 12, 1900, for analysis a sample of a purchase of about 4 tons of rice meal which he had purchased. The invoice read: "November 16, 1900. Sixty-four bags rice meal, 80 cwt. 2 qrs. 13 lb., at 4*l*. 13*s*. 9*d*. per ton, 18*l*. 17*s*. 11*d*."

In sending the sample the member wrote: "Will you please give me the analysis of the enclosed sample of rice meal? It seems differently made to what I have been using. It looks more like ground rice and husks together and very dusty—cost about 5*l*. a ton at our station."

Dr. Voelcker's report after analysis was:—

Moisture	9·47
Oil	5·52
*Albuminous compounds (flesh-forming matters)	8·00
Starch, digestible fibre, &c.	35·76
Woody fibre (cellulose)	28·49
†Mineral matter (ash)	12·76
	100·00
* Containing nitrogen	1·28
† Including silica	9·52

This is not "rice meal," and should not be so described. It is about three-quarters ground rice husks, of little or no feeding value, and one quarter rice and rice meal.

J. A. VOELCKER.

Upon the member first complaining to the vendors about the appearance of the delivery, and previously to his sending a sample to Dr. Voelcker, he received from the vendors the following letter dated December 1, 1900:—

"We have your letter of yesterday. Recent analyses have proved this dark rice meal quite as good in quality (oil) as the white. For some time this would not pass on an English contract, but it is now taken every day as 'fair average quality' meal. The great bulk of it is used by the compound cake makers, and the colour makes no difference to them if the test is the same, so that it does not pay the maker now to keep the meal white, as they get just the same price for the brown. If you *must* have white, well you have to pay quite a fancy price for it, and you cannot *always* get it then. All that comes here is bought 'through' London, where it is sampled, sealed, and tested, so we shall have to send to London for a test, as we are sorry we have not one ourselves on hand at present. Hope you will find it turn out better than you expect. The great trade in compound cakes is making it very difficult to secure the raw material and use it yourself as a consumer. They command such enormous quantities of stuff."

Subsequently to receiving the report, the member interviewed the vendors, then writing to Dr. Voelcker on January 18, 1901, as follows:—

"I agreed with the firm for 25*s*. per ton in lieu of 4*l*. 13*s*. 9*d*., and they have expressed their regret that they should have sent it without having had an analysis made of the stuff."

E. W. STANYFORTH, Chairman.

March 5, 1901.

Botanical and Zoological.

Mr. BOWEN-JONES reported that the leaflet on "A Serious Disease in the Cherry Orchards of Kent" had been published, in accordance with instructions given at the last meeting, and that several hundred copies of it had been circulated, and that permission had been given to the Royal Horticultural Society and to various newspapers to reprint the leaflet. Experiments were about to be started to decide the possibility of destroying *Colchicum autumnale* by the application of some chemical substance.

Veterinary.

The Hon. CECIL T. PARKER (Chairman) reported that the Committee had settled the list of veterinary surgeons to be invited to act as Veterinary Inspectors at the Cardiff Meeting. The Annual Report for 1900 of the Principal of the Royal Veterinary College had been submitted, and the Committee recommended that copies of it be struck off in pamphlet form and circulated amongst those interested, in anticipation of its publication in the Journal. A letter had been received from Professor Bang, of Copenhagen, which was interesting on account of the parallel it suggested between the condition of things in relation to foot-and-mouth disease in this country and in Denmark. The Committee therefore recommended that publicity should be given to the following summary of Professor Bang's communication:—

Referring to the early history of the disease, Prof. Bang states that from 1869 to 1871 foot-and-mouth disease was prevalent in various parts of Denmark; then it existed to a slight extent in 1875, 1876, and 1878. On the subsidence of these outbreaks the country remained free until October, 1892, when the disease again appeared, and continued until September, 1893. About 400 outbreaks occurred on separate farms. Up to this time slaughter was not generally adopted. The endeavour to trace the outbreaks failed in each case.

It was known that the disease was prevalent in Germany during the time, but no animals were imported from Germany, nor, as a rule, was fodder from Germany imported. There is, however, a record of one outbreak that occurred at a considerable distance from the German frontier, and it was ascertained that the practice was to bring German fodder on to that particular farm. It was also known that German traders very commonly visited the herds in Denmark in the ordinary course of their business.

Dr. Bang remarks that very often foot-and-mouth disease appeared at points distant from each other without any apparent communication between the places "as in England just now."

In the course of his inquiry, Dr. Bang was led to suspect the railways, and he remarks that careful disinfection of the railway trucks seemed to be of some use. Since 1896 foot-and-mouth disease has appeared in the country occasionally—once or twice a year—but, after a most careful inquiry, they have never been able to trace the source of the outbreaks. Latterly the policy of slaughter has been rigidly carried into effect; even in the event of a single calf being attacked with the disease, the whole of the cattle, sheep, and swine on the premises have been at once slaughtered.

Dr. Bang suggests, at the conclusion of his communication, as a possible cause of the introduction of the disease, that birds might fairly be suspected, as they could easily carry the infection on their feet from one place to another

The following report on cases of infectious diseases amongst animals had been received from Professor McFadyean:—

ANTHRAX.—During the first eight weeks of the year 98 outbreaks, with 140 animals attacked, have been reported. The corresponding figures for last year were 83 and 129 respectively.

GLANDERS.—During the same period of this year 195 outbreaks, with 363 animals attacked, have been notified. These figures represent a serious increase in the prevalence of this disease, since the outbreaks reported during the corresponding period of last year were 158, and the number of animals attacked was 304.

SWINE FEVER.—During the first eight weeks of this year 291 outbreaks have been notified, this being an increase of four outbreaks as compared with the corresponding period of last year.

RABIES.—No case of this disease has been detected during the present year.

FOOT-AND-MOUTH DISEASE.—Since the last meeting of the Committee three fresh outbreaks have been detected. One of these was in Kent and the other two were in Suffolk, and in each case only sheep were affected. The total number of outbreaks reported since the beginning of the year is nine, in which 571 animals have been attacked. During the same period of last year there were seven outbreaks, with 99 animals attacked.

MISCELLANEOUS.—The number of morbid specimens forwarded to the Research Laboratory at the Royal Veterinary College for examination during the month of February was 69.

Stock Prizes.

Mr. SANDAY (Chairman) reported that Mr. Christopher Graham's Galloway cow, "Jane Stanley 4th," No. 1,099, exhibited as in-calf at the York Meeting, and which was awarded the third prize of *5l.* in Class 130, having failed to comply with the conditions of regulation 60 of the York prize-sheet as to calving, the Committee recommended the disqualification of the cow in question, and the award of the prize to the Reserve animal, Mr. W. Parkin-Moore's "Mac's Tidy of Whitehall," No, 1,101, exhibited at the York Meeting as in-milk.

The second edition of the stock prize-sheet for the Cardiff Meeting, containing particulars and regulations of the horse-jumping and butter-making competitions, had been issued and was now in circulation.

Judges Selection.

Mr. SANDAY (Chairman) reported that invitations to act as judges at the Cardiff Meeting had been issued to the gentlemen nominated at the last meeting of the Committee, and that with very few exceptions the Society's invitation had been accepted.

Implement.

The Hon. CECIL PARKER reported that the gentlemen invited to act as judges in the Implement Department of the Show had all accepted office.

General Cardiff.

Lord MORETON reported that the Committee had given directions as to the military band to be engaged for the Cardiff Meeting. They recommended that Class 60 in the Cardiff prize-sheet, for colliery horses not exceeding 14h. 2in., be limited to animals which had been worked underground for a period of not less than three months before the Show.

Showyard Works.

Mr. CRUTCHLEY reported that a commencement had been made by the Superintendent with the works of the Cardiff showyard, and that the greater portion of the exterior fencing had been completed. The Committee recommended that a second entrance to the showyard should be provided for the convenience of persons arriving from the Llandaff side.

Selection.

Sir JOHN THOROLD (Chairman) submitted correspondence from the municipal authorities of Blackpool and Carlisle, at both of which towns meetings had been held with the object of inviting the Society to hold the Show of 1902 in their district. In view of the resolution passed by the Council at their previous meeting on February 6, empowering the Committee of Selection to consider invitations from towns in any part of England that might be willing to receive the Society in 1902, the Committee recommended that any final decision as to the place of next year's Show should be deferred until the next meeting of Council on April 3, and that the Hon. Cecil Parker, Mr. Percy Crutchley (Honorary Director) and Mr. H. P. Ryland be appointed as a Committee of Inspection to visit the various sites that might meanwhile be offered to the Society, and to confer with the local authorities of the towns that were contemplating an invitation to the Society for 1902.

After some general discussion, this recommendation was adopted.

Dairy.

Mr. DUGDALE (Chairman) reported that the Committee had considered and recommended for adoption the plan of the Dairy for the Cardiff Meeting. Most of the gentlemen selected as Judges for the Produce Department had accepted office, and instructions had been given with a view of completing the list.

Special Show Committee.

The Hon. CECIL PARKER (Chairman) brought up a further Report from the Special Show Committee appointed to select a site in the neighbourhood of London for a permanent showyard for the Society. The Committee reported that since their last Report to the Council in December, they had had frequent meetings, and had had under careful consideration a great variety of suggestions as to sites. The only one of these suggested sites that complied with the Society's requirements was one at Twyford Abbey, between Willesden Junction and Ealing, about seven miles from the Marble Arch. The Committee were unanimously of opinion that this site was admirably adapted as a permanent showyard for the Society. The new line of the Great Western Railway to Wycombe would run close to the boundary of it, there would be ample facilities for access by the London and North-Western Railway at Willesden, and other systems; the population in the neighbourhood was large and was rapidly increasing, and no site so favourable for the Society's operations was in the view of the Committee likely to be found in the neighbourhood of the Metropolis. It was obvious that under present circumstances the Society was not in a position to provide the funds requisite for the acquisition of the site, but options of purchase of the land (about 150 acres in all) had been obtained, and the Committee were in hopes that financial arrangements might be made under which the Society would be able to lease on reasonable terms that portion of the total area that it would require for a showyard.

This being a matter on which action might become necessary at short notice, a Sub-committee of members of the Special Committee resident in or near London was, on the motion of the Hon. CECIL PARKER, appointed by the Council, with power to enter into negotiations with any purchaser of the site as to the terms on which the Society could rent about 100 acres of the site for the purposes of a permanent showyard.

Date of next Meeting.

Other business having been transacted, the Council adjourned until Wednesday, April 3, 1901.

WEDNESDAY, APRIL 3, 1901.

EARL CAWDOR (PRESIDENT) IN THE CHAIR.

Present:

Trustees.—Colonel Sir Nigel Kingscote, K.C.B., Viscount Ridley.

Vice-Presidents.—The Earl of Derby, K.G., the Earl of Feversham, the Hon. Cecil T. Parker, Mr. Charles Whitehead, Sir Jacob Wilson.

Other Members of Council—Mr. J. H. Arkwright, Mr. R. C. Assheton, Viscount Baring, Mr. J. Bowen-Jones, Lord Arthur Cecil, Mr. Percy Crutchley, Lieut.-Colonel Curtis-Hayward, Mr. A. E. W. Darby, Mr. J. Marshall Dugdale, Mr. S. P. Foster, the Marquis of Granby, Mr. R. M. Greaves, Mr. James Hornsby, Mr. John Howard Howard, Captain W. S. B. Levett, Mr. Henry D. Marshall, Mr. Joseph Martin, Lord Middleton, Mr. W. A. Prout, Mr. J. E. Ransome, Mr. Frederick Reynard, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr. Henry Smith, Mr. Martin J. Sutton, Mr. Garrett Taylor, Mr. E. V. V. Wheeler.

Officers. — Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton-Bracebridge, Assistant Director; Mr. R. S Burgess, Superintendent of the Showyard.

Professor Sir George Brown, C.B.

Mr. D. T. Alexander, of the Cardiff Local Committee.

Apologies for non-attendance were read from the Earl of Coventry, Earl Spencer, K.G., Lord Brougham and Vaux, Lord Moreton, Sir Walter Gilbey, Bart., Sir J. H. Thorold, Bart., Mr. Alfred Ashworth, Mr. George Blake, Mr. Victor C. W. Cavendish, M.P., Mr. H. Chandos-Pole Gell, Mr. W. Frankish, Mr. C. S. Mainwaring, Mr. T. H. Miller, Mr. P. A. Muntz, M.P., Mr. Albert Pell, Mr. C. C. Rogers, Mr. E. W. Stanyforth, Mr. J. P. Terry, and Mr. R. A. Warren; and Messrs. S. A. Brain, Robert Forrest and James Howell, of the Cardiff Local Committee.

Election of New Members.

The election of the following twenty-three members was then proceeded with:—

*Abraham, C. A ..The Howard Estate Office, Glossop.
Asplin, W...Church Street, Ambleside.
Batting, C...Ironworks, Maidenhead.
Cobbe, W. H...Portarlington, Queen's co
Cory, H. B...Druidstone, Castletown, Cardiff.
*Cullen, Capt. C...Wollaton, Nottingham.
Formby, J...Firwood, Formby, Liverpool.
Gowers, C. R...Foundry House. Malden.
Horne. W. E...Hall Place, Shackleford.
Jenkins, J. C. Bryngwyn, Newbridge, Mon.
Leney, H...Selling Court, Faversham.
Lipscomb, G...Estate Office, Margam Park, Port Talbot.
Lushington, H. V...Lenham, Maidstone.
Martin, F...Hubberts Bridge, Boston.
Maynard S. T...The Gables, Burgess Hill.
Moat, W...Johnson Hall, Eccleshall.
*Mookerji, Devendra Nath, Assistant Director of Agriculture, The Writer's Buildings, Calcutta
Morant, E. J ..Boldre, Lymington.
Pott, C. S , Howbourne, Buxted.
Rumble, J. S...Tyburn, Birmingham.
Wigan, Rev. P. F...Puckrup Hall. Tewkesbury.
Williams, E...Victoria Hotel, Barry.
Windover, O. F...Sandford House, Huntingdon.

* Re-instated under Bye-law 12.

Royal Patronage of the Society.

The minutes of the previous meeting, held on March 6, having been read and approved,

The President observed that they would have noted from the minutes that a humble petition had been presented by him on behalf of the Society to His Majesty the King, that His Majesty would be pleased to accept the office of Patron of the Society. He had since had the gratification of receiving from the Keeper of His Majesty's Privy Purse the following letter:—

[COPY.] Privy Purse Office,
Buckingham Palace:
11th March, 1901.

My Lord,—I have the honour to inform you that I have submitted to the King your letter of the 8th ultimo, and in reply I am commanded to say that His Majesty is pleased to accede to the request to grant his patronage to the Royal Agricultural Society of England.

I am,
My Lord,
Your obedient Servant,
(Signed) D. M. PROBYN, General,
Keeper of H.M.'s Privy Purse.
The Earl Cawdor.

Anticipating the wishes of the Council, he had already written to Sir Dighton Probyn, requesting him to submit to the King the dutiful and grateful thanks of the Council and members of the Society for this further mark of His Majesty's favour to it. He now had the pleasure of moving that His Majesty's gracious message be entered upon the minutes of the Council. (Hear, hear.)

A letter from the Secretary of State for the Home Department, conveying, by command of the King, His Majesty's thanks for the Society's address of condolence with His Majesty and the Royal Family on the occasion of the lamented death of Her late Majesty Queen Victoria, was also ordered to be entered on the minutes.

Meeting of 1902.

The SECRETARY having laid upon the table the formal invitations for the holding of the Meeting of 1902, received from the Corporations of Blackpool and Carlisle, together with the official schedules of queries signed by the Mayor and Town Clerk of each town,

The PRESIDENT said that as deputations were now in waiting from Blackpool and Carlisle, he would at once call on the Honorary Director to read the Report of the Committee of Inspection.

Mr. PERCY CRUTCHLEY (Honorary Director) said that it would be within the recollection of the Council that at their last meeting, held on March 6, correspondence had been submitted from the municipal authorities of both Blackpool and Carlisle, indicating that at each town meetings had been held with the object of inviting the Society to hold its Show of 1902 in their district.

The Council had on March 6 decided to postpone their decision until April 3, and had appointed a Committee of Inspection to visit during the interval the two towns, with the view of examining the sites and other accommodation offered, and of conferring with the local authorities. Accordingly Mr. Howard Ryland, Mr. E. V. V. Wheeler, and himself, attended by the Secretary and the Superintendent, had paid a visit to Carlisle on March 27, and to Blackpool on March 28, and the Committee were indebted to the local authorities for the facilities which had been offered to them in making their inspection. After describing in detail the character and positions of the several sites, the railway accommodation, and other matters, Mr. Crutchley said that at either town a site was available, which the Committee were of opinion could be made suitable as a showyard for the Society without any serious administrative difficulty; and it must therefore rest with the Council to decide on more general grounds than the sites at which of the towns from which invitations had been received the Society's Show should be held in 1902. There was an important letter from the Royal Lancashire Society, received at the Society's office after the Committee of Inspection had completed their inquiry, which it would be necessary for the Council to consider when deliberating upon this matter; and he thought, therefore, it would be desirable that it should be read at this stage.

The SECRETARY then read a letter dated March 28, received from the Secretary of the Royal Lancashire Society, enclosing a report of the remarks of Mr. John White (Chairman of the Finance Committee of that Society), and of Mr. John T. Wood, at the quarterly meeting of the Council held at Liverpool on March 27, at which the following resolution was unanimously passed on the motion of Mr. White :—

> That this Council beg to draw the attention of the Royal Agricultural Society of England to the arrangements that have already been made for the holding of the County Society's 1902 Show at Preston; and the exceptional circumstances under which the Society accepted the invitation from Preston render it impossible to withhold the Show. That, therefore, the holding of the Royal Agricultural Society of England's Show at Blackpool in the same year would undoubtedly be detrimental to the interests of both Societies.

The Earl of **Derby** said that as he had undertaken to introduce the deputation from Blackpool it might be convenient that he should explain the position of matters with regard to the resolution from the Royal Lancashire Society which had just been read. The Lancashire Society had now become very representative of the county, and its annual Show had become one of the largest in the kingdom. Usually the Lancashire Show was held at the end of July or the beginning of August; but in 1902 it would be held at Preston in September, in order to form part of the festivities in connection with the celebration of the Guild Merchant, a historical event of great importance in Preston, held once in every twenty years in the month of September. It had been the custom to hold an agricultural exhibition at Preston during the Guild week, and in March, 1900, a preliminary inquiry had been made by the Town Clerk of the Royal Agricultural Society as to the possibility of its coming to Preston in 1902. As the Royal Society did not see its way to change the time of holding its Show from the accustomed time in June to September, the Preston authorities arranged with the Royal Lancashire Society for the holding of that Society's Show at Preston next year; and this was an arrangement which could not, under the circumstances, be altered. As to Blackpool, this was a very large seaside resort, and sometimes as many as 100,000 persons visited the town in one day on pleasure bent; but whether that made it the best place for the Society's Meeting was quite another matter. Blackpool, as they knew, stood on the seashore and on the edge of an agricultural district; but it was a district which could not compare in any way as an agricultural centre with Carlisle. Personally speaking, therefore, although he introduced the deputation from Blackpool to the Council, he thought it was a question for the Society to consider whether it would not be better to go to Carlisle in preference to Blackpool. The Blackpool deputation were perfectly aware of his views, and fully understood the conditions upon which he introduced them.

After some discussion as to procedure,

The **President** suggested that the deputations should now be received by the Council, and be informed that the Secretary would communicate to them any decision the Council might come to, so as to avoid the necessity for their being kept waiting.

Invitation from Blackpool.

Lord **Derby** then formally introduced the deputation from the town of Blackpool, consisting of the Mayor (Mr. T. H. Smith), Mr. Alderman Kingsbury, M.D. (ex-Mayor), and Mr. T. Loftos (Town Clerk).

The **Mayor** of **Blackpool** said his Corporation believed that one of the main things that was required was the success of the Royal Show. If the Society did them the honour of visiting their town next year there was no doubt at all about the advantages which they could offer, whether in the way of the railway facilities, or accommodation, or other matters, and there was no doubt that they would have a great success. Seeing that the Society's Show was to be situated in London for the future, they would naturally desire their last Meeting in the provinces to be a great success. Not only had Blackpool miles of railway sidings, as the Society's Inspection Committee had doubtless informed them, as well as other facilities, but the enthusiasm which had been displayed in Blackpool itself, and by the farming element for miles around, tended to demonstrate that they would have a good Meeting. He would not trouble the Council with any particulars about the town, the railways, advertising, and other facilities which the place possessed, and which were quite unique. Blackpool was within easy reach of many places, viz., 15 minutes from the Belfast boat; Preston, 35 minutes; Manchester, 70 minutes; and London 5½ hours. Their railway facilities were ample, and as regards accommodation, the town often welcomed from 50,000 to 100,000 people in one day. This latter was a point of importance which he specially wished to bring under the Society's notice. The Council might be interested to know of the monetary position of their local fund. Up to the present they had obtained 5,727*l.* from about 400 subscribers. These subscriptions were obtained not only from the town of Blackpool, but from the farming element all round it. By the following day, no doubt, there would be about 6,000*l.* subscribed. He trusted the Council would, therefore, see its way to hold its Show of 1902 at their town.

Mr. Alderman KINGSBURY (Deputy Mayor) observed that he hardly thought it was necessary to add anything to what the Mayor had said in connection with Blackpool's invitation to the Society to hold its Show in their town in 1902. They were much obliged to the Council for receiving them there that day, and greatly indebted to Lord Derby for having introduced them. He was very anxious to avoid anything in the way of controversy, as he understood there were other places also desirous of having the Society next year; but there was one point he should like to mention, viz., the resolution that the holding of the Society's Show in Blackpool in 1902 might have a prejudicial effect upon the Show to be held by the Royal Lancashire Society in Preston in September of the same year. Great pains had been taken to find out as well as they could the feeling in Preston on this point, and they had endeavoured to make quite sure, before asking the Society to accept their invitation, whether its acceptance would militate against the success of the Lancashire County Show held in September. It was gathered, however, that the holding of the Royal Show three months before the County Show would not, as it was thought, affect its success, but would act rather as a stimulant; and the effect, if any, of holding the Show a little further north would be quite as great as holding the Show at Blackpool. The Chairman of the County Council, Sir John Hibbert, was wholly in favour of the Show being held at Blackpool in 1902, and whilst he (Mr. Alderman Kingsbury) had no word to say in disparagement of the claims of other places, he trusted the Society would decide to visit Blackpool. As the Mayor had told them, the railway facilities that could be afforded at Blackpool were all that could be desired, both in regard to the convenience of the passenger traffic and the accommodation of the railway sidings. Then again, Blackpool was close to a vast population, and they could tap the districts of Lancashire, Yorkshire, Cheshire, and the Midlands. There were, moreover, other attractions in the place which would doubtless act in a magnetic fashion. He had much pleasure in supporting the invitation tendered by the Mayor, and he knew that if the Society should decide to visit Blackpool, they would have the hearty support of the authorities.

The PRESIDENT having asked the Council if any member desired to put any question to the deputation,

Mr. CRUTCHLEY stated that, so far as the Committee of Inspection were concerned, they had no question which they desired to put. At the time of the inspection they went thoroughly into the matter of the sites, and the authorities of Blackpool had met them in a most liberal manner, and any requirements that the Committee had suggested had been answered to their entire satisfaction.

Invitation from Carlisle.

The PRESIDENT having thanked the members of the deputation from Blackpool for their attendance, and the members having withdrawn,

Mr. S. P. FOSTER introduced a deputation from the City of Carlisle, consisting of the Mayor of Carlisle (Mr. John Hurst), Mr. B. Scott (Chairman of the General Purposes Committee), Mr. George White (Deputy-Chairman of the Finance Committee), the Town Clerk of Carlisle (Mr. A. H. Collingwood), the City Surveyor (Mr. H. C. Marks), Mr. Claude Lowther, M.P., and Mr. R. Rigg, M.P. Mr. Foster explained that Lord Muncaster and the Speaker of the House of Commons were prevented by illness from joining the deputation, but he hoped that the arguments and facts which would be adduced would result in the Council deciding to take the Royal Show to Carlisle in 1902.

The TOWN CLERK of CARLISLE said that at a meeting of the City Council, held on March 29, it had been unanimously resolved, on the motion of Mr. Alderman Scott (Chairman of the General Purposes Committee), seconded by the Mayor, that the Royal Agricultural Society of England should be invited to hold its Meeting of 1902 at Carlisle. He had very little to add to that resolution, except to say that the Corporation had deputed their Mayor and the other members of the deputation to attend there that day, and to offer the Society a very cordial welcome in the event of it being decided to hold the Show of 1902 in their city. Carlisle was the centre of a very large agricultural district, comprising the county of Cumberland, the south of Scotland, Westmorland, Northumberland, and some portion of North Lancashire. From inquiries which the Corporation had felt it their duty to make through the Mayor, they were satisfied that there was a very general desire on the part of large landowners and others interested in agriculture, that what they had reason to believe was the last country Meeting of the Society should be held in their district. The deputation from the city waiting upon the Council was supported by Mr. Claude Lowther, M.P. (representing North Cumberland), and Mr. Rigg, M.P. (representing North Westmorland); and he might add that the movement had the support of, amongst others, Lord Muncaster (the Lord-Lieutenant of the County), the Member for their city, the Speaker of the House of Commons, and the Members of Parliament for various districts in the vicinity. In addition to other large landowners, the Duke of Devonshire (who had promised a handsome donation) was in sympathy with the project. It would therefore be seen that there was no division of opinion in the district as to the propriety of inviting the Royal Society to hold its Show of 1902 at Carlisle. Further, most of the different local agricultural societies had held meetings of their subscribers, and had, with one or two exceptions, decided not to hold their local shows in 1902 in the event of the Royal Agricultural Society's Show of that year being held at Carlisle. There were one or two shows which would take place in 1902, but they would be held in the latter part of that year; but even these, with the others, had promised to contribute towards the general expenses of the Meeting. The Royal Agricultural Society had already honoured their city with two visits—in 1855 and 1880; and they would receive an equally cordial welcome if they paid Carlisle a third visit in 1902.

The MAYOR of CARLISLE said he wished to endorse all that had been said by the Town Clerk. Carlisle was a great railway centre, and every facility would be afforded if the Society decided to visit their city in 1902. Their subscriptions were coming in very well, which he thought was a proof that if the Show was held at Carlisle it would be well supported.

Mr. CLAUDE LOWTHER, M.P., said that it gave him much pleasure to support the views which had been put forward by the Mayor and Town Clerk, and he could only add that the district was unanimous in the desire for the Society to visit Carlisle in 1902. There was no division of opinion at all on this point, and he personally trusted that the Society would be willing to hold their Country Meeting of next year in that city.

Mr. RANSOME asked whether the site was the same as that on which the previous Show was held in 1880, when they were nearly flooded out.

Mr. FOSTER said that the rainfall at the time of the 1880 Show was the heaviest in his memory, and was not likely to happen again.

The TOWN CLERK explained that since the last Show the river bank had been to a large extent embanked, and embankment works were still in progress.

The question of the provision of a suitable temporary bridge over the narrow stream intersecting the site having been raised by Mr. CRUTCHLEY, and an undertaking having been given on behalf of the Carlisle Corporation to provide a bridge adequate to the requirements of the Society, The PRESIDENT thanked the deputation for their attendance, and informed them that they would be acquainted with the decision of the Council in due course. The deputation then retired.

Selection of Carlisle.

Viscount RIDLEY, in moving the acceptance of the invitation from Blackpool, said that as he had been connected for a considerable number of years with that constituency, he should like to bring before the Council for their consideration the claims of that town. He quite recognised the position of affairs with reference to the Royal Lancashire Society's Show at Preston, and, of course, he felt to a great extent the objection that the Council would naturally have to accepting an invitation from Blackpool in the face of the resolution of the Lancashire Society. Naturally, the main object which the Council had to look at was the success of the Society. Without entering into a comparison between Carlisle and Blackpool, he honestly thought that a very successful Show could be held at the latter town. He believed that the railway facilities at Blackpool were as good as at Carlisle, and the accommodation at Blackpool was much superior to that of the more northern town. He did not wish to underrate the advantages of Carlisle, but the facilities of the railway accommodation at Blackpool for dealing with enormous masses of traffic could not be lost sight of. There was no doubt it was a habit of the surrounding population to save up their money and take an outing at Blackpool, and if they could be induced to visit the place at the period when the Show was there, there would undoubtedly be a large influx of visitors to their showyard. He felt, of course, the force of the objection which had been taken to the Society visiting Blackpool, but it was for the Council to say whether under the special circumstances of next year they thought it desirable to hold their Show at Blackpool or at Carlisle. For his own part, he thought the Society would not regret going to Blackpool, if they considered that circumstances permitted it.

Lord DERBY begged to support all that had been said by his friend Lord Ridley, and he quite thought that the Blackpool authorities had not stated anything that day they would not be prepared thoroughly to carry out.

Mr. SUTTON was of opinion that, in face of the resolution which had been received from the Royal Lancashire Society, it would be very undesirable for the Royal Agricultural Society to go to Blackpool in 1902.

Mr. FOSTER in moving the acceptance of the invitation from Carlisle, said that, as they knew, Carlisle was really a double centre—a great agricultural centre and a great railway centre, the principal lines, to the number of six, running into the city, and some smaller lines as well. The situation was everything that could be desired, and the station and sidings were good in whichever direction one went. He did not desire to say one word against Blackpool; but if they wanted to secure any sort of attendance at Blackpool, it would, he thought, be necessary to reduce the charge of admission to the showyard from 1*s.* to 6*d.* on the cheap days. Besides that, they would have to hold their Show in August or September, instead of in June. He trusted that the Council would remember that Carlisle was the first to hold out the hand to ask the Society to visit their city next year; and as the Meeting of 1902 would be the last itinerant Show of the Royal Agricultural Society, he felt strongly that it should be held at Carlisle next year.

The Earl of FEVERSHAM observed that the conditions for holding the Show of next year at Carlisle were very favourable, for not only was the city, but the county generally, united in supporting the movement. He was one of those who trusted that the door would not be altogether shut against the Society holding country Meetings in the future. Even though they might have a permanent showyard near London, he still hoped that they might have the opportunity, when it seemed desirable, to hold their Show in different parts of the country. It appeared to him that there were strong reasons for the holding of the Society's Show of 1902 at Carlisle. Carlisle was the centre of a splendid agricultural industry. He did not suppose that if they went from one end of the country to the other, such excellent cultivation or farming would be found as was to be seen within the radius of Carlisle; and in the great agricultural county of Northumberland the same remarks applied. As they went North they found the most successful results obtained in agricultural industry, and surely one of the most important, and, indeed, the first object of this Society was to encourage that industry; and, moreover, as regards the breeds of stock, the county of Cumberland was famous. He hoped, therefore, seeing the conditions were so favourable, that the Society would seek to give encouragement to the hardy agriculturists of the North by holding their Show of 1902 in the city of Carlisle.

Sir **NIGEL KINGSCOTE** said the Council were placed in a difficult position, since on the one hand the views expressed by the Royal Lancashire Society, which the Council would hardly wish to ignore, seemed to put a visit to Blackpool out of the question; and, on the other, the Society would, so far as he was able to judge, almost certainly lose money if it went to Carlisle. Whilst Carlisle was undoubtedly the centre of an extensive agricultural district, the attendance of the public at a Show to be held in that city would hardly be expected to pay expenses on the scale which the prize-sheets of the present time had made necessary. The Society had a great deal of work before it in the preliminaries for the holding of its first Show on the new permanent site at Twyford for which they were now in treaty; and in view of the disastrous results of the last three Shows, it was his duty, as Chairman of the Finance Committee, to tell the Council the Society could not afford to lose much more money or run any such risks as seemed to be inevitable at Carlisle. He was personally of opinion that, under the circumstances, the Society would act more wisely in having no Show at all in 1902, but in concentrating its effort on the preparations for a Show in 1903 on the new permanent show-yard.

Mr. **H. D. MARSHALL** desired to support the views of Sir Nigel Kingscote. Their sympathies, no doubt, were with Carlisle, but it was a question whether the Society could afford to go there. On the other hand, he thought the temptation to go to Blackpool was very great.

Sir **JACOB WILSON** wished to support the invitation which had been received from Carlisle, for the particular reason that the first Royal Show which he had attended was at Carlisle in 1855. He was also present officially at the Society's second Show held in that city in 1880, and he hoped he might have the opportunity of attending the third Show of the Society there in 1902. In his opinion nothing would be so fatal to the future interests of the Society as the dropping of a year in their Shows. It had always been the case amongst local Shows that they invariably lost members when this procedure was adopted, and very considerably so. With regard to the statement as to the certainty of losing money, he was sorry not to be able to agree with what Sir Nigel Kingscote had said on this point, as he recalled to mind that when the Society last visited Carlisle in 1880 they had, even under the then prevailing unfavourable conditions of weather, only lost a little over 500*l.* He was of opinion that if the matter was left in the hands of the Honorary Director, and one or two more, the prize-sheet could be so arranged to fit the case. The site at Carlisle was an absolutely picturesque one. What they would see if the Society went to Carlisle next year was a good, substantial agricultural Show, and something that would benefit the agriculture of the country. As to the railway station at Carlisle, on the last occasion of the Show being held there it was in an unfinished state; but it was now completed, and into that station ran seven independent railways. Since 1880 the train service, too, had been very much expedited, for whereas the journey from Newcastle to Carlisle then took three hours, it now occupied only an hour and a half to accomplish the journey; and this acceleration of the train service thus brought within easy reach of Carlisle a population of a quarter of a million. Cumberland itself was famous for its Shorthorns, its beautiful blue-greys, and for its breeds of horses; and he felt very strongly that if in the future they were going to locate the Society's showyard near London, they would, by going to Carlisle, do much to stem the tide of unpopularity in the North, and at the same time be doing real good to the agriculture of the country, for which object the Society was originally instituted.

Mr. **CRUTCHLEY** thought that in view of the information which the Council had before them respecting the Show at Preston in 1902, the idea of the Society vsiting Blackpool next year was out of the question, for it would undoubtedly be the wish of the Council to act in the most friendly manner possible with the Royal Lancashire Society. This being so, he trusted that the advocates of Blackpool would not press the claims of that place. As to Carlisle, there were no large towns within fifty or sixty miles of the city, and the district around was chiefly agricultural. As Carlisle did not possess a large population close to the Show, they would have to depend upon the railway companies to bring the people to the showyard. From their past experience of the railway companies they had been made aware that they must not rely upon too much in this direction. He did not think it safe to count upon a large attendance at Carlisle. On the whole, he believed it would be more prudent to restrict their expenses to the smallest possible dimensions. They had had experience, however, in the past that if the Stock Prizes Committee attempted to cut down the prize-sheet, their action was likely to be overruled in that room directly afterwards. He thought that they should restrict the breeds to be exhibited, and the number of classes offered in the various breeds. Whatever they did, he was strongly of opinion that they must make up their minds to cut down expenses.

The Marquis of **GRANBY** said that the question under consideration had arrived at a very curious development. They appeared to be faced by three alternatives. Some members of Council advocated the holding of the Society's Show of 1902 at Carlisle, and some at Blackpool, in addition to which it had been suggested that they should not have any Show at all that year. So far as he could gather Blackpool was not "going very strong," and he agreed with Mr. Crutchley that the idea of the Society visiting Blackpool next year should be abandoned. Reference had been made to the claims of the hardy agriculturists of the North to consideration, but they had also to consider the claims and interests of their own Society. It was no good trying to hide the disagreeable fact that the finances of the Society were not in so satisfactory a condition as they had been. It seemed to him, therefore, that what they had to consider was whether they should study the agriculturists of the country or the interests of the Society itself. Would they be more injuring themselves by running the risk of a loss at Carlisle next year or by deciding not to have a Show at all? On the whole, his personal tendency was that they must adventure something. He did not believe that by standing aside for a year they would be consulting the best interests of the Society, but that it would be better to run the risk of incurring a loss, and to hold the Show at Carlisle.

The Hon. **CECIL PARKER** supported the views of Sir Nigel Kingscote upon this question.

Mr. **RANSOME** observed that it was difficult to decide what to do for the best. In his opinion they would undoubtedly get a good deal more gate-money if the Society held its Show at Blackpool, and if they went to Carlisle they would, he felt sure, have a great loss. He failed to see that it would make much difference at Preston whether a great Show was held north of the town or west of the town.

Mr. **GREAVES** said that, from the point of view of a breeder and exhibitor, he viewed with alarm the suggestion that this Society should suddenly give up holding the Show as usual, as exhibitors would be preparing their animals for next year.

He trusted that the Council would very carefully take into their consideration the point of view of the breeder and exhibitor before coming to a decision not to hold a Show.

Lord **Ridley** said he was willing to accept the expression of opinion on the subject of the Society's visiting Blackpool next year, and would not press his motion in support of the claims of that town, for he recognised that at the present moment the Society appeared to have no choice but to accept the invitation from Carlisle.

Sir **Nigel Kingscote** said that as there seemed to be a strong feeling in favour of the Society visiting Carlisle he would defer to this view, but at the same time he would strongly urge upon the spending committees the desirability of their using their utmost endeavours to restrict for the Show of 1902 the expenditure on prizes and other features of the Show that involved large outlay.

Mr. **Bowen-Jones** said that he trusted that they were not going to have an emasculated Show, for at any rate the breed societies would, no doubt, be willing to give prizes as usual.

After further discussion, it was unanimously resolved, on the motion of Mr. S. P. **Foster**, seconded by the Earl of **Feversham**:—"That the Society's Meeting of 1902 be held in the city of Carlisle, subject to the usual agreement being entered into with the Society by the Mayor and Corporation."

The Reports of the various Standing Committees were then presented and adopted, as below:—

Finance.

Sir **Nigel Kingscote** (Chairman) reported that the accounts for the month ended March 30, 1901, as certified by the Society's Accountants, showed total receipts amounting to £4,426 0*s.* 9*d.*, and expenditure amounting to £4,031 2*s.* Accounts amounting in all to £2,913 6*s.* 2*d.* had been passed and were recommended for payment.

The Committee laid upon the table the balance-sheet for the year 1900, as finally audited by the Society's Accountants, Messrs. Welton, Jones and Co., and two of the three Auditors appointed by the members, Messrs. Henry Grinling and Jonas H. Webb (see pages xii to xix). The third Auditor, Mr. A. H. Johnson, had, the Committee regretted to say, recently been obliged to undergo an operation for his eyesight, and was in consequence prevented from attending the recent audit of the Accounts for 1900. Mr. Johnson had felt it incumbent upon him, under these circumstances, to tender his resignation of the post of Auditor, the duties of which he had fulfilled with so much advantage to the Society for a long series of years; and it would, therefore, be necessary for the members to appoint a fresh Auditor.

The quarterly statement of subscriptions, arrears, and property on March 31, 1901, was also laid upon the table. The Committee had made further progress in clearing from the Register, in accordance with the bye-laws, the names of a considerable number of members from whom no subscriptions had been received for several years, and who had not replied to the numerous communications addressed to them on the subject by order of the Committee.

Balance-sheet for 1900.

Sir **Nigel Kingscote** added, with reference to the audited balance-sheet for 1900 and the statements of receipts and expenditure which he now laid upon the table, that these would be printed and circulated amongst all the members of the Society before the Anniversary General Meeting on May 22, with the Report of the Council to be presented on that occasion. But he might take that opportunity of mentioning that there were no particular items of the ordinary receipts and expenditure that required comment, as the figures, both in detail and in the total result, were much the same as in the previous year. The total expenditure of the Society for 1900 (other than that connected with the Show) was 9,806*l.*, as against 9,819*l.* in 1899. The system of rendering the Society's accounts was fully explained in paragraph 9 of the Report of the Council to the last General Meeting held on December 13, 1900; and he need, therefore, only say then that the obligation imposed upon the Council of administering a Society of over 10,000 members, of whom considerably more than a third were life members from whom no annual subscription was received, left them no alternative in the "lean years" from which the Society had lately suffered but to trench on the invested capital, which they had been endeavouring to preserve as a Reserve Fund, from which to pay to the income of the year the share of the current expenses due from the Life Governors and members who paid no annual subscription.

Each year the Society's liabilities to the body of life members of course diminished by the effluxion of time; but he was afraid it must be said that the Reserve Fund was being depleted much more rapidly than their liabilities decreased. The broad result was that the total assets of the Society on December 31, 1900—including invested capital (17,823*l*.), fixtures, furniture, machinery, country meeting plant, &c.—were 31,324*l*., as against 37,419*l*. at the end of 1899, a diminution of nearly 6,100*l*., accounted for as follows:—708*l*. for depreciation, 3,516*l*. deficits of the income and expenditure accounts, and 1,871*l*. difference between the amount added to and that taken from the Reserve Fund under the system explained in the Council's report of last December.

As he had observed when commenting on the figures of the York Meeting (which resulted, as they were aware, in a loss of 3,465*l*.) the enormous risk on the Shows which the Society now ran was not one which the Finance Committee could look upon with complacency. As the forthcoming Cardiff Show would be almost the last to be held under the present system, he had said last November that the Finance Committee did not desire by any sudden action of their own to imperil the success of that Show; but they had never concealed their opinion that the risk for which the Society—with diminished resources—now made itself responsible in connection with the Shows was too great; and the fact that already there was a shrinkage in the receipts for the Implement entry-fees at Cardiff as compared with York, seemed to the Finance Committee to emphasise the importance of the Committees chiefly responsible for the expenditure on the Shows taking the state of the Society's finances into their most serious consideration.

House.

Sir NIGEL KINGSCOTE (Chairman) also presented a report from this Committee on matters of detail.

Chemical and Woburn.

Mr. F. REYNARD reported that a letter had been received from Mr. E. W. Stanyforth resigning the Chairmanship of the Chemical Committee on account of ill-health. The Committee recommended that a letter of thanks be sent to Mr. Stanyforth expressing their high appreciation of the manner in which he had conducted the work of the Committee, and their regret that he found himself under the necessity of resigning. The appointment of a new Chairman had been deferred until the next meeting of the Committee. Dr Voelcker had reported the conclusion of the Sheep Feeding Experiments and the progress of the Bullock Feeding Experiments at Woburn.

The death was reported of Mr. J. J. Forrester, the Manager of the Woburn Experimental Farm, who had died on March 13 from wounds received at Lichtenberg, whilst serving in Paget's Horse in South Africa. The Committee had passed a vote of condolence with Mr. Forrester's family, which they had desired should be sent to his father, Mr. James Forrester.

Dr. Voelcker had presented the following report on adulterations which had recently come under his notice as Consulting Chemist to the Society:—

REPORT OF CONSULTING CHEMIST.

I.—Cotton Cake Meal for Feeding Purposes.

A member of the Society sent on February 9 a sample of what had been offered as pure Egyptian cotton seed meal at 3*l*. 15*s*. free on rails, guaranteed 7 per cent. of oil. On analysis this was found not to answer to the description given, but to be a dark-coloured, acid and fermented meal, not in sound condition or fit to be used for feeding purposes. The analysis having been sent to the member before the purchase was completed, delivery was not taken.

II.—Badly Made Decorticated Cotton Cake.

A member sent on February 13 a sample of decorticated cotton cake, which on analysis proved to be very hard and a badly-made cake, full of hard lumps and blotches. A small quantity of the cake had already been used, but on receipt of the report it was discontinued, as it was intended to return the remainder of the delivery to the vendors.

III.—Decorticated Cotton Cake Imperfectly Freed from Husks.

A member sent on February 18 a sample of decorticated cotton cake, invoiced as kibbled decorticated cotton cake, at 7*l.* 5*s.* per ton. The buyer had been informed by the vendor that it was a soft cake rich in oil, and, although dark in colour and having a few husks in, was worth 7*s.* 6*d.* per ton more than the bright hard-pressed cakes. On analysis it was found that the cake was not properly freed from husks, and was consequently higher in fibre and considerably lower in nitrogen than a decorticated cotton cake would be, nor of equal value to the latter.

IV.—Necessity of Having a Definite Guarantee.

A member sent on January 28 a sample of linseed cake, of which he had purchased two tons. The invoice given at the time of purchase read as follows: "Jan. 4.—Two tons L. cake at 8*l.* 7*s.* 8*d.*, 16*l.* 15*s.*" This invoice bore in small letters on the right-hand top-corner the following note: "Fertilisers and Feeding Stuffs Act, 1893.—We hereby declare that all feeding stuffs upon this invoice not therein specially described as pure are prepared from more than one substance or seed." On observing this I wrote to the buyer on January 28 as follows:—

"The invoice you sent me describes the cake as '2 tons L. cake.' 'L.' cake, of course, means linseed cake, and if a cake is invoiced as linseed cake, this implies that it is pure, *i.e.*, made only from the seed indicated by the name.

"The invoice has a notice printed on it to the effect that the feeding stuffs sold are not guaranteed to be made from one substance or seed unless they are described on the invoice as 'pure' This being so, if you intended to get linseed cake, and not what is sometimes called 'oil cake' in the trade, and which is not guaranteed to be linseed cake, *i.e.*, pure linseed cake, your proper plan is to write to the vendors and tell them you are not satisfied with the invoice, that you wanted linseed cake, and they must give you another invoice describing the cake as 'linseed cake' or 'pure linseed cake' (as they make a point of the word 'pure'). If they will not give you a fresh invoice on these terms, then tell them that they can take their cake back, as you asked for linseed cake—meaning (as this term does, according to the Fertilisers and Feeding Stuffs Act) pure linseed cake—and you mean to get it."

On February 8 the buyer replied: "The vendors in selling me the cake said it was a fresh lot, and if pure was a cheap cake, but they had doubts about it; but if I would try it and have it analysed, and it proved impure, they would meet me in it. They were anxious to know how it analysed before they sold much of it."

The cake was eventually analysed with the following result:—

	February 25, 1901.
Moisture	13 85
Oil	10·83
*Albuminous compounds (flesh-forming matters) . . .	22·62
Mucilage, sugar, and digestible fibre	40·22
Woody fibre (cellulose) . .	6·83
Mineral matter (ash) . .	5·65
.	100·00
* Containing nitrogen . .	3 62

"An impure cake, containing starchy matters and many weed seeds, rape mustard, corn cockle, chenopodium, polygonum, and others being present. The low percentage of nitrogen is indicative of the impurity. A good linseed cake would be about 1 per cent. richer in nitrogen."

V—Rice Meal with Excess of Husk.

A member of the Society on February 21 sent a sample of rice meal in order to know whether it was pure. The price was 5*l.* 17*s.* 6*d.* per ton. It was found on analysis that the meal had an excessive quantity of husk, and was consequently low in oil and a good deal higher in indigestible woody fibre than a good rice meal would be. There was also admixture of maize meal.

The analysis was as under:—

Moisture	10·05
Oil	7·86
†Albuminous compounds (flesh-forming matters) . . .	10·18
Mucilage, sugar, and digestible fibre	54·04
Woody fibre (cellulose) . .	10·92
Mineral matter (ash) . .	6·95
	100·00
† Containing nitrogen . .	1·62

(Signed) J. Augustus Voelcker.
April 2, 1901.

Botanical and Zoological.

Mr. Reynard reported that the Consulting Botanist was still pursuing his study of the serious disease in the cherry orchards of Kent, and had reached a further stage in the life history of the spores producing the fungus. The Committee had requested him to continue his investigations during the summer months. Copies of the report of the Departmental Committee of the Board of Agriculture on "the conditions under which agricultural seeds are at present sold," together with the minutes of evidence, had been laid before the Committee, and they proposed at their next meeting to consider the recommendations contained therein.

The Zoologist had presented the following report:—

REPORT OF ZOOLOGIST.

Among the ordinary insect pests inquired after during the past month are *Tipula* (crane fly) in grass land and various lepidopterous grubs which attack fruit and leaves.

Advice was asked with regard to a bad attack of the "wood wasp" *Sirex* in larch plantations. The grubs sent in this instance were not those of the *Sirex*, but of the large ichneumon fly, *Rhyssa persuasoria*, parasitic on *Sirex*. It is of great importance in such cases to remove and destroy sickly and badly-infested trees, and especially any dead and fallen trunks, which are a suitable breeding-place for the insect.

A pest not previously inquired about was the willow scale insect, *Chionaspis salicis*, stated to be doing considerable injury to willow trees in one district.

The narcissus fly, *Merodon equestris*, was alleged to be doing much injury to bulbs in a neighbourhood where narcissus-growing is an important industry.

The large grubs of this fly leave the bulbs to turn to chrysalids in the ground, and the best way to combat this pest is to deal with the ground in the autumn, when the bulbs are taken up, in such a way as to destroy the grubs and chrysalids.

(Signed) CECIL WARBURTON.

April 2, 1901.

Veterinary.

The Hon. CECIL T. PARKER (Chairman) laid upon the table copies of the Annual Report for 1900 of the Principal of the Royal Veterinary College, which had been printed and circulated.

Professor McFadyean had presented the following report:—

ANTHRAX.—During the four weeks ending the 23rd March, 55 outbreaks, with 72 animals attacked, were reported. The corresponding figures for the same period of last year were 40 and 61 respectively.

GLANDERS.—During the same four weeks the number of outbreaks reported was 85, and the number of animals attacked 143, as against 77 outbreaks and 146 animals attacked during the corresponding period of last year.

SWINE FEVER.—238 outbreaks have been reported during the past four weeks, and 1,228 pigs have been slaughtered as diseased or exposed to infection. During the same period of last year the outbreaks numbered 113.

RABIES.—No case of this disease has been detected during the current year.

FOOT-AND-MOUTH DISEASE. - Only one outbreak has been reported during the past four weeks, viz., one in Suffolk, which occurred during the first week of March. There were 33 cattle and 22 sheep on the infected premises, and the whole of these were slaughtered as soon as the diagnosis was confirmed.

The steady increase in the reported outbreaks of glanders during the past year, and the more recent recrudescence of swine fever, constitute very unsatisfactory features in the official returns.

MISCELLANEOUS.—During the month of March specimens from 43 cases of disease were forwarded to the Research Laboratory at the Royal Veterinary College, and during the same period two diseased animals were received for post-mortem examination.

Stock Prizes.

Mr. SANDAY (Chairman) reported that a question having arisen as to the interpretation of Regulation 58 of the Cardiff Meeting, the Committee recommended that entries be accepted in the classes for cows in milk, of animals which, according to the certified date of bulling, were due to calve at least ten days before the Show. The Secretary had been instructed in such cases to withhold the papers entitling the animal to admission to the showyard until a formal certificate that the cow had calved on or before June 16 was in his possession.

Judges Selection.

Mr. SANDAY (Chairman) reported that the List of Judges in the several classes was now complete.

Implement.

Mr. BOWEN-JONES reported that the Allotment Committee had met on Monday, April 1, and had arranged the position of the stands in the Implement Department at the Cardiff Meeting.

General Cardiff.

Mr. CRUTCHLEY reported that the band of the Plymouth Division, Royal Marines, had been engaged to play in the Cardiff showyard. The Local Committee had kindly undertaken, on behalf of the Society, to provide the necessary materials for the timbering and splicing competitions which had been arranged to take place on Friday, June 28, Saturday, June 29, and Monday, July 1, at 11 o'clock in the morning.

Showyard Works.

Mr. CRUTCHLEY reported that the erection of the shedding for implements, the framework of the grand stand, and the Dairy in the Cardiff showyard were completed; the pavilions were in a forward state, and the sleeper roads were being proceeded with

Selection.

The Hon. CECIL T. PARKER reported the recommendation of the Committee that Mr. Alexander Henderson, M.P., of Buscot Park, Faringdon, Berks, be elected a member of Council to fill the vacancy caused by the death of Mr. Samuel Rowlandson.

The formal election of Mr. Henderson as a member of Council was moved by the Hon. CECIL T. PARKER, seconded by Mr. G. H. SANDAY, and carried unanimously.

Education.

Mr. DUGDALE reported that forty-eight entries had been received for the next Examination for the National Diploma in the Science and Practice of Agriculture, to be held in the great Hall at the Yorkshire College, Leeds, on Monday, May 6, and following days, forty-two of which were for Part I., and the other six being candidates who (having passed Part I. in 1900) were eligible to compete in Part II. this year. Copies of the pamphlet on "Specimen Courses for Classes in Rural Elementary Schools," published by the Board of Education, had been laid before the Committee.

Dairy.

Mr. DUGDALE (Chairman) reported that the Dairy Committee had considered at length the Majority Report of the Departmental Committee of the Board of Agriculture on Milk Standards, and had desired to submit for the consideration of the Council a resolution which they had arrived at, "that the standards proposed in that report were too high." But, recognising that it would be impossible for the Council to discuss the matter that day in view of the other business to be transacted, he would postpone bringing the resolution forward until the next meeting of the Council (see page liv).

Special Show Committee.

The Hon. CECIL PARKER (Chairman) said it would be within the recollection of the Council that at their last meeting the Special Show Committee had presented a report recommending, as the site of the Society's future permanent showyard, some land at Twyford Abbey, between Willesden and Ealing, and had expressed their hopes that financial arrangements might be made under which the Society would be able to lease, on reasonable terms, that portion of the total area which it would require for a showyard. The Council had adopted this report, and the matter being one on which action might become necessary at short notice, a Sub-Committee of members resident in or near London was empowered to enter into negotiations with any purchaser of the site, as to the terms on which the Society could rent about 100 acres of the site for the purposes of a permanent showyard. The Sub-Committee had since been actively engaged in the matter, and had presented on Monday last their recommendations as to the terms of the lease and other financial matters, which the Special Committee after careful consideration now presented for the approval of the Council.

Mr. MARTIN was of opinion that before this question was gone into by the Council the report, with appended papers, should be printed and circulated amongst the Council, with a view to the recommendations being considered at the next meeting.

Lord FEVERSHAM desired to know whether, before any agreement binding the Society with regard to this land was entered into, the Council would have a full opportunity of discussing it, and whether they would have all the *pros* and *cons* presented to them before the Council came to a final decision.

The Hon. CECIL PARKER pointed out that the Special Show Committee had been engaged all the winter in deliberating on this question, and had, after devoting much anxious consideration to the matter, decided to recommend the Council to fix on the Twyford site, which, as reported at the March meeting, was the only one of the sites suggested to them that in their opinion complied with the

Society's requirements. It would be impossible now to open again the main question of the selection of the site.

Mr. Bowen-Jones agreed with Mr. Martin that more information was required before the Council came to a decision as to the desirability of the project, and seconded the motion for postponement.

Mr. Sutton and Mr. Ransome also supported this view.

Mr. Sanday said that as a member of the Sub-Committee who had been concerned in the negotiations, he must point out that there were substantial objections to postponement of the matter, as there were others besides the Council whose interests had to be considered. It had already been necessary that some adjoining land should be secured, in order that the scheme might not fall through, and the option which had been obtained over the site was rapidly running out. There were still many considerations to be settled, more particularly the arrangements necessary to be made with the railway company. Some important works of railway construction had been postponed pending the Council's decision, and though he recognised that in view of the opinions expressed by Mr. Martin and others the matter could not be now carried further that day, he felt that it ought to be distinctly understood that it was absolutely essential that a final decision should be arrived at by the Council at their next meeting on May 1.

After some further discussion, in which Mr. Martin, Mr. Crutchley, Sir Nigel Kingscote, Mr. Marshall, Mr. Bowen-Jones, the Hon. Cecil Parker, and others took part, it was decided that the Committee's report should be circulated with the next agenda-paper, and that as postponed business it should, under the Standing Orders, be taken immediately after the Report of the Finance Committee on May 1.

Retiring Members of the Council.

The following list was prepared of the members of Council who retire by rotation, and are eligible for re-election, showing the number of attendances at Council and Committee meetings of each of such members during the past two years, in accordance with the subjoined sections of Bye-law No. 23:—

> (*a*) A list of the members of Council who retire by rotation, but are desirous of re-election, showing the number of attendances at Council and Committee Meetings of each of such members during the two years ended the previous March, shall be prepared at the April Council, and published immediately in at least two agricultural papers. (*b*) No member of Council who does not attend at least two Council Meetings in each of the two years for which he is appointed shall be eligible for re-election. (*c*) Any two Governors or Members may nominate in writing to the Secretary, before the 1st day of May following, a member or members of the Society desirous of being nominated for election on the Council; these nominations, with the names of the proposer and seconder, shall also be added to the previously published list, and the entire list shall be published in the same agricultural papers immediately after the May Council, and be also printed for the use of members at the General Meeting in May.

Attendances at Meetings of Council and Committees from April, 1899, to March 1901, inclusive	Council Meetings. Total number, 18	Committees	
		No. of Meetings	Attendances
Ashworth, A.	12	113	41
Assheton, R. C. . . .	11	21	10
Baring, Viscount . . .	11	27	23
Bowen-Jones, J. . . .	17	85	42
Cornwallis, F. S. W. .	14	50	32
Crutchley, Percy . .	18	128	107
Darby, Alfred E. W. .	13	55	37
Dugdale, J. Marshall	17	80	70
Gorringe, Hugh . .	10	10	3
Greaves, R. M. (elected May 2, 1900) . . .	5	9	3
Jersey, Earl of . . .	9	16	12
Mainwaring, C. S. . .	11	85	44
Martin, Joseph . . .	15	55	30
Middleton, Lord. . (elected Nov. 1, 1899)	8	17	9
Miller, T. H.	14	39	27
Pease, Alfred E., M.P.	5	29	8
Pell, Albert	10	48	31
Prout, W. A. (elected Dec. 12, 1900) . .	2	—	—
Reynard, Frederick .	18	73	72
Smith, Alfred. . . .	11	57	50
Stanyforth, E. W. . .	11	105	74
Taylor, Garrett . .	10	39	31
Terry, Joseph P. . .	14	46	28
Wilson, C. W.	11	27	12

Date of next Meeting.

Other business having been transacted, and the seal of the Society affixed to two new certificates of Harewood House Debenture Stock, the Council adjourned until Wednesday, May 1, 1901.

WEDNESDAY, MAY 1, 1901.

EARL CAWDOR (PRESIDENT) IN THE CHAIR.

Present:

Trustees.—The Duke of Bedford, Sir Walter Gilbey, Bart., Colonel Sir Nigel Kingscote, K.C.B., Viscount Ridley, Earl Spencer, K.G., Sir John Thorold, Bart.

Vice-Presidents—H.R.H. Prince Christian, K.G., Mr. H. Chandos-Pole-Gell, the Earl of Coventry, the Earl of Feversham, Lord Moreton, the Hon. Cecil T. Parker, Sir Jacob Wilson.

Other Members of Council.—Mr. J. H. Arkwright, Viscount Baring, Mr. George Blake, Mr. J. Bowen-Jones, Mr. Victor C. W. Cavendish, M.P., Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Colonel Curtis-Hayward, Mr. A. E. W. Darby, Mr. J. Marshall Dugdale, Mr. S. P. Foster, Mr. William Frankish, Mr. Hugh Gorringe, Mr. R. M Greaves, Mr. James Hornsby, Mr. John Howard Howard, the Earl of Jersey, G.C.B., Captain W. S. B. Levett, Mr. Henry D. Marshall, Mr. Joseph Martin, Lord Middleton, Mr. T. H. Miller, Mr. A E. Pease, M.P., Mr. Albert Pell, Mr. W. A. Prout, Mr J. E. Ransome, Mr. Frederick Reynard, Mr. C. C. Rogers, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr Alfred J. Smith, Mr. Henry Smith, Mr. E. W. Stanyforth, Mr. Richard Stratton, Mr. Martin J. Sutton, Mr. Garrett Taylor, Mr. Joseph P. Terry, Mr. R. A. Warren, Mr. E. V. V. Wheeler, Mr. J. C. Willliams, Mr. C. W. Wilson.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton-Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard.

Professor Sir George Brown, C.B.

The following members of the Cardiff Local Committee were also present:—Mr. D. T. Alexander and Mr. S A. Brain.

Apologies for non-attendance were read from Lord Brougham and Vaux, Mr. Alfred Ashworth, Mr. R. C. Assheton, Mr. C. S. Mainwaring, and Mr. Charles Whitehead.

Election of New Governor and Members.

The minutes of the last monthly meeting of the Council, held on April 3, 1901, having been taken as read and approved, the election of the following Governor and nineteen members was then proceeded with:—

Governor.

TRENCH, Col. the Hon. William le Poer, R.E... 3, Hyde Park Gardens, W.

Members.

BUCKLAND, H. W...Rupert Ho., Lower Wick, Worcester.
DAVIS, S. P...Kings Acre Road, Hereford.
DURRANT, G...Richmond House, Harleston.
EVANS, D...Llangennech Park, Carmarthen.
FLETCHER, T. J...Luddington, Goole.
GRATTON, J. L...Foryd Fawr Farm, Abergele.
GUNN, Sir John..Llandaff, Cardiff.
HEATHCOTE, J. S...Kemsey Manor, Newport, Salop.
HIPKINS, W. E...Soho Foundry, Birmingham.
HUNT, G. W...Madresfield, Malvern.
MOTTRAM, W...Ebnal Hall, Oswestry.
PARKS, E. W...Wellingborough.
*RIDLEY, W...Shilford, Stocksfield-on-Tyne.
ROBERTS, G...Stowe Manor House, Weedon.
SEABROOK, W...Berden Priory, Berden.
*STOTT, J...Lee Street, Oldham.
WILLIAMS, W...Penlline Street, Cardiff.
WILSON, C. F...Old Ford Road, Aberdeen.
WILSON, H. C...care of Tomlinson and Hayward, Lincoln.

* Re-instated under Bye-law 12.

Finance.

Sir NIGEL KINGSCOTE (Chairman) reported that the accounts for the period ended April 27, as certified by the Society's accountants, showed total receipts amounting to 2,247*l.* 7*s.* 2*d.*, and expenditure amounting to 2,913*l.* 9*s.* 4*d.* Accounts amounting in all to 2,385*l.* 9*s.* 8*d.* had been passed, and were recommended for payment. The Committee recommended that books of twenty-five tickets, admitting on either of the shilling days at the Cardiff Meeting (Saturday, June 29, or Monday, July 1), be issued to employers of labour at the price of 1*l.* per book. The Committee had made further progress in clearing from the Register, in accordance with the bye-laws, the names of a considerable number of members from whom no subscriptions had been received for more than two years, and who had not replied to the numerous communications addressed to them on the subject by order of the Committee.

Site for Permanent Showyard.

The Council next took up, as business postponed from the last meeting on April 3, the consideration of the recommendation of the Special Show Committee for the rental by the Society of a plot of land, about 100 acres in extent, at Twyford, between Willesden Junction and Ealing, for the purposes of the future Permanent Showyard of the Society.

The Hon. CECIL PARKER (Chairman of the Committee) said that it would be within the recollection of the Council that, after full discussion at their meeting held on August 1, 1900, it was resolved "that it is desirable to obtain a site in the neighbourhood of London for the purposes of the Society's Permanent Showyard," and the Committee were asked to continue their labours on this basis. Since the autumn recess the Committee had held (besides a number of informal conferences) six full meetings, on October 11, November 5, December 10, 1900, February 4, March 4, and April 1, 1901, and had reported their proceedings to the Council from time to time. After careful consideration of a number of sites which had been suggested to them in various parts of London, the Committee finally arrived at the unanimous conclusion that the only one of these suggested sites that complied with the Society's requirements was one at Twyford Abbey, between Willesden Junction and Ealing, about seven miles from the Marble Arch; and they reported to the Council on March 4, 1901, their opinion that this site was admirably adapted for the requirements of the Society, and that no site so favourable for the Society's operations was, in their view, likely to be found in the neighbourhood of the Metropolis.

The Committee added in their March Report that it was obvious that under present circumstances the Society was not in a position to provide the funds requisite for the acquisition of the site, but that options of purchase of the whole site (over 150 acres in all) had been obtained, and the Committee were in hopes that financial arrangements might be made under which the Society would be able to lease on reasonable terms that portion of the total area that it would require for a showyard. As this was a matter on which action might become necessary at short notice, the Special Committee recommended that a Sub-committee of members of the Committee resident in or near London should be appointed, with power to enter into negotiations with any purchaser of the whole site as to the terms on which the Society could rent about 100 acres for the purposes of a permanent showyard.

This course having been approved by the Council, the Sub-committee commenced their negotiations, and had, after considerable labour and trouble, found a capitalist who was willing to purchase the whole site of about 150 acres, and to lease to the Society the 100 acres which it would require at an annual rental of 1,000*l.*, with an option to the Society of the eventual purchase of the 100 acres on defined terms.

The full Committee having carefully considered these proposals, had, at the April meeting, unanimously recommended them for the acceptance of the Council; and it was for the Council now to decide whether or not they approved of the Committee's recommendation that this land should be leased by the Society.

The question of the capital expenditure necessary for equipping the site with the requisite permanent buildings had, of course, engaged the serious attention of the Committee. These works might be divided into (*a*) those absolutely necessary—viz., draining, levelling, gas and water piping, roads and fencing, and (*b*) those which, while not essential, would be necessary if proper advantage was to be taken of having a fixed site, such as providing permanent stabling and some of the more substantial structures of a showyard—the provision of which would admit of the site being utilised at an early date for other objects besides the Society's Show. Most of the former class of work had in the past been carried out at the expense of the Local Committees, but this source of income would no longer be available.

Whatever sum was required for equipment expenses must be raised either by loan or by voluntary contributions, as it was manifest that the Society's present financial position would not enable it to borrow at interest anything like the capital sum required for the equipment of a permanent showyard without seriously endangering the whole future of its operations apart from the shows. The Committee thought, therefore, that efforts should be made to obtain from those specially interested in the continuance of the shows and in the welfare of the Society, contributions by way of gift to these equipment expenses, so as to diminish the heavy annual burden which would otherwise fall on the Society for loans granted on necessarily stringent conditions as to payment of interest and repayment of capital.

Mr. **Parker** added that on former occasions the reports of the Special Show Committee had, under a resolution passed by the Council on May 30, 1900, been considered in Committee of the whole Council, and he now formally moved that the Council resolve itself into Committee for the purpose of considering this matter.

Mr. **Victor Cavendish**, M.P., seconded the motion, which was carried unanimously.

Various points were raised in Committee—by Mr. C. W. **Wilson**, as to the use of the land for purposes other than the Society's shows; by Mr. E. V. V. **Wheeler**, as to the improvement of the railway facilities for passengers and sidings for the Show traffic; by Mr. G. **Blake**, as to the lapsing of the buildings on the site to the landlord, and as to the possibility of raising the money on debentures; by Mr. J. P. **Terry**, as to the extension of the lease; by Mr. R. **Stratton**, as to the Society itself purchasing the site.

A discussion also took place as to the means of providing the money necessary for the equipment of the site, Mr. **Stratton** advocating the provision of temporary buildings and other arrangements, as to which Mr. J. C. **Williams** observed that in a permanent showyard they would expect to have permanent roads, permanent drainage, and permanent water supply, and Mr. **Crutchley** pointed out that these expenses were necessary, and would be one of the ultimate economies of a permanent showyard.

The Earl of **Jersey**, Mr. **Sutton**, and others having spoken,

Mr. **Sanday**, replying as a member of the Sub-committee who had been chiefly concerned in the negotiations, said that all the points raised had already received careful consideration, and the proposition now submitted was the best that, after much negotiation, the Sub-committee had been able to obtain in the interests of the Society. No extension of the lease beyond fifty years could be looked for, but within that period the Society had always the option of purchase on terms defined beforehand, and on a year's notice it could abandon the lease. Negotiations were in progress with the Great Western Railway under which they would be able to secure a railway station (practically on the site itself) on the new direct line between London and High Wycombe, now in course of construction. It would be impossible for the Society to entertain the question of itself purchasing a site of 150 acres, only 100 acres of which it required, and the remaining 50 acres of which could be only slowly developed as building property. He hoped that it was distinctly understood by the Council that the purchase of the whole site by the capitalist who had expressed himself willing to entertain the project was dependent upon 100 acres of it being leased to the Society, and that, so far as that gentleman was concerned, the terms of the proposed lease were final. As the options over the property would shortly expire, it was essential, if the negotiations for the acquisition of the entire site were not to fall through, that the Council should decide that day as to whether the recommendations of the Committee were or were not approved by them.

The Council having resumed, and the motion for the adoption of the Committee's recommendations having been put from the Chair,

Mr. **STRATTON** said that he felt bound to move an amendment in order to give expression to his objections to the proposal of the Committee, that contributions should be invited from members towards the equipment expenses of the proposed permanent showyard. He thought it would not be difficult to obtain the necessary amount by loan from the members, which would be a more dignified course to pursue than asking for gifts. With regard to the expense in laying out the yard, he did not understand that it was proposed to erect buildings which would be of a permanent character, and if the yard was laid out in a temporary manner—*i.e.*, with wooden structures, similar to those which they had been in the habit of using, preserved no doubt with gas tar or creosote—an excellent yard could be provided, which would last for probably thirty or forty years. He thought the site suggested an excellent one, and that there would be no risk incurred with regard to the investment. He fully approved of the scheme as a whole, but he did not like the idea of canvassing for funds.

Mr. **GARRETT TAYLOR** said he desired to support the views that had been brought forward by Mr. Stratton on this subject, as the general feeling undoubtedly was not in favour of such a proposal. If the Finance Committee could see some other way of raising the money it would be a very great advantage.

Sir **WALTER GILBEY** said that Mr. Stratton seemed to regard the Committee's desire to seek funds from the public as rather a derogatory proceeding on the part of the Society. He would remind Mr. Stratton, and those gentlemen who had agreed with him, that a deputation from their Society had gone down to the Mansion House for the purpose of raising money in connection with the Society's Kilburn Show in 1879, and again at the Windsor Show of 1889, and it was not thought derogatory to do this on those occasions. He hoped that the money required for the equipment of their permanent showyard might be raised in the City of London. He did not wish to be too sanguine upon it; but, at any rate, he did not think it would be detrimental to the prestige of the Society to ask the public for funds.

Sir **NIGEL KINGSCOTE** said that, as Chairman of the Finance Committee and a member of the Special Show Committee, he could assure the Council that they had discussed every possible means of raising the money required to carry out the project. Every hundred pounds they received would help; and what he desired to see was that in the end this showyard would not become a temporary but a permanent showyard. Moreover, if they made proper provision for such a showyard, they would get other societies there. The annual burden which would fall on the Society if these equipment expenses were raised on loan, with stringent conditions as to payment of interest and repayment of capital, would be very heavy, and might cripple the whole future of the operations of the Society. The matter had been very carefully considered in all its bearings by the Special Show Committee, and he felt that the proposals they had submitted were the best that the Society was likely to be able to carry out.

The Earl of **COVENTRY** expressed the hope that Mr. Stratton would not press his proposal. After the very sensible remarks that had been made by Sir Walter Gilbey, he thought that the matter was put in a different light than was believed at first.

The Earl of **FEVERSHAM** said he was one of those who were not entirely in favour of excluding the possibility of holding their Meetings in other parts of the country. He was certain that, whether they had a fixed Show or not, there were certain people in distant parts of the country who would much regret if their great Society did not hold its shows in various parts of the provinces. If it were decided to have their Show near London, still it was hoped that the Society would not be excluded from the possibility of having a meeting in the country too. He would, therefore, beg to move:—

> That this Council, while sanctioning the proposal of the acquisition of land for the holding of a Show near London, as proposed by the Committee, does not exclude from itself the power of holding a Show in any part of the country where the circumstances are favourable.

The **PRESIDENT** suggested that it was hardly necessary to put this motion, as there was nothing in the present proposals to exclude the holding of a Show elsewhere than at the proposed permanent showyard, if at any future time the Society thought it expedient to do so.

Mr. **SUTTON** remarked that he would wish to refer those present to the statement made by Sir Nigel Kingscote at the last meeting, that the Society's income did not cover its annual expenses, apart from all question of the Show. That being so they were, he thought, not in a position to undertake the carrying out of the project now before them. As he wished to place his views on the question on record, he begged to move:—

> That, in the opinion of this Council, the state of the finances of the Royal Agricultural Society of England does not warrant the adoption of the Twyford land as a site for a central show.

After some further discussion, Mr. Stratton's amendment was negatived without a division, and Mr. Sutton's amendment not being seconded fell to the ground.

The recommendations of the Special Show Committee were then formally approved, and the matter was referred back to the Committee for the necessary steps to be taken in accordance therewith.

House.

Sir **NIGEL KINGSCOTE** (Chairman) reported that various accounts connected with the House had been passed and referred to the Finance Committee for payment, and that the accounts for the past year of the Harewood House Debenture Stock had been signed by the Trustees.

Journal.

Sir **JOHN THOROLD** (Chairman) reported that the Committee recommended that the Report of the Council to the Anniversary General Meeting, to be held on the 22nd instant, should be published and circulated to all the members in anticipation of the meeting. The Committee had given further consideration to the question of the future conduct of the Journal, and recommended that it should be more in the nature of Transactions, recording the acts and accounts of the Society during the previous year, the reports on the Show, the reports of the officers of the Society, reports on the season and harvest, and a *résumé* of matters interesting to farmers during the past year, together with one or two articles of permanent interest to the farming community. For this purpose the Committee recommended the appointment of an Assistant Editor to take charge of the details of the preparation and issue of the Journal.

Chemical and Woburn.

Mr. **BOWEN-JONES** reported his election as Chairman of the Committee in succession to Mr. Stanyforth, who had been compelled to resign on account of ill-health. Various matters in connection with the chemical work of the Society and details connected with the Woburn Experimental Farm had been discussed and directions given thereon.

Botanical and Zoological.

Mr. **WHEELER** (Chairman) reported that the Consulting Botanist was still investigating the disease affecting the cherry orchards in Kent, a leaflet on which had been published by the Society. Examples of the young fruit of the fungus, which had been artificially produced in the laboratory, had now been found on the dead leaves upon and under the trees. The Committee had considered the recommendations of the Departmental Committee of the Board of Agriculture appointed to inquire into the conditions under which agricultural seeds are at present sold, and, after prolonged discussion, had unanimously decided—

That in the opinion of this Committee, members of the Society who use the Order Forms for Seeds, which have already been sanctioned by the Council, have all the safeguards they require without the establishment of a Central Seed Testing Station.

Veterinary.

The Hon. CECIL T. PARKER (Chairman) presented the following report from Professor McFadyean:—

ANTHRAX.—During the sixteen weeks of this year for which the official returns have been issued, 221 outbreaks, with 327 animals attacked, have been notified. For the corresponding period of last year the figures were 179 and 283 respectively.

GLANDERS.—During the same period there have been 377 outbreaks, with 644 animals attacked, as against 337 outbreaks and 609 animals attacked during the first sixteen weeks of last year.

FOOT-AND-MOUTH DISEASE.—Since the last meeting of the Council three fresh centres of this disease have been detected. The first of these was reported from Suffolk on April 7, and the other two from Essex on April 8 and 12 respectively. The total number of outbreaks for the present year is twelve, with 665 animals attacked.

SWINE FEVER.—During the first sixteen weeks of the year there have been 935 outbreaks, as against 563 for the corresponding period of last year. Serious as these figures are, they scarcely disclose the full extent to which the disease has recently increased. The outbreaks for the last four weeks number 406, as against 163 for the corresponding four weeks of last year.

RABIES.—Unfortunately a case of this disease was reported during the week ending April 20. It occurred in Carmarthenshire, and, in addition to the diseased animal, two dogs have been destroyed as having been exposed to infection.

MISCELLANEOUS.—During the month of April thirty-nine morbid specimens were forwarded to the Research Laboratory at the Royal Veterinary College for examination. These included cases of anthrax, black-quarter, tuberculosis, actinomycosis, glanders, tumours, parasitic gastritis, &c. During the same period an outbreak of contagious abortion among mares, and losses among ewes and lambs from worm parasites have been locally investigated.

Stock Prizes.

Mr. SANDAY (Chairman) reported that a letter had been received from the Shire Horse Society informing the Council that it was proposed to award prizes of 5*l* to the breeders of the animals to which that Society's gold medals were awarded by the Royal Agricultural Society in 1901, on condition that such breeders are members of the Shire Horse Society, and that the dams are mares registered in the Stud Book. The Committee recommended that the thanks of the Council be sent to the Shire Horse Society for the award of these breeders' prizes.

The Committee had further considered the question of the Jumping Competitions for the Cardiff Meeting, and had recommended that Classes A and D should compete on Thursday, June 27; Class B on Friday, June 28; Class C on Saturday, June 29, and that a Consolation Class be added for competition on Monday, July 1, with prizes of 10*l*., 5*l*., and 3*l*, and an entry fee of 10*s*., to be divided between the first, second, and third prize winners, in addition to the prizes.

Judges Selection.

Mr. SANDAY (Chairman) reported that the List of Judges had been completed, issued to intending exhibitors, and published in the agricultural papers. The Committee had selected the names of gentlemen to be asked to act as umpires in case of necessity.

Implement.

Mr. FRANKISH (Chairman) reported that the Committee had discussed the arrangements for the Implement Trials at the Cardiff Meeting, and they recommended that the trials of portable oil engines (for which eight entries had been received) and ice-making plant (for which one entry had been received) should commence at 9 a.m. on Wednesday, June 19.

General Cardiff.

Mr. CRUTCHLEY reported that the Cardiff Local Committee had kindly undertaken to provide the prizes, amounting to 18*l*., for the additional class in the Jumping Competitions, suggested by the Stock Prizes Committee (see above).

Showyard Works.

Sir JACOB WILSON (Chairman) reported that the Committee had considered the arrangements for the grand stand in the Cardiff Showyard, and recommended that the prices for admission should remain as in former years, viz., Wednesday, Thursday, and Friday, 5*s*. for reserved enclosure, and 2*s*. for unreserved day tickets; and on Saturday and Monday, 2*s*. 6*d*. reserved enclosure, and 1*s*. per day ticket.

Selection.

Sir JOHN THOROLD (Chairman), having read the report and recommendations of the Committee of Selection, said that the time had arrived when it was necessary to consider the question of the Presidency for 1901–2, and the Committee had come to the unanimous conclusion that the name of His Royal Highness Prince Christian, K.G. (Vice-President), should be suggested to the General Meeting to be held on the 22nd instant, as President of the Society for the ensuing year. The Committee felt that they could not have a more appropriate President for the Society than His Royal Highness Prince Christian, who had always shown so great an interest in its affairs.

Viscount RIDLEY, in seconding Sir John Thorold's motion, said that they were well aware of the active interest taken by His Royal Highness in their affairs and in agriculture generally, and therefore he most cordially supported the recommendation that H.R.H. Prince Christian should be elected their President for the ensuing year.

The motion having been unanimously adopted,

His Royal Highness PRINCE CHRISTIAN said: I feel much honoured by the motion which has just been carried, and beg to thank the mover and seconder for the kind terms in which they have proposed my election as President of this Society for the ensuing year. You will all be aware of the great interest I have taken in the work of the Royal Agricultural Society, and I have had the honour of being a member of its Council since 1889. I feel sure that if I am elected at the General Meeting of the Society you will give me your kind support on all occasions, and I will do all in my power to further the interests of this Society and of agriculture, which I have so much at heart. I beg again to thank you for the great honour you have done me. (Hear, hear.)

On the motion of Sir JOHN THOROLD, seconded by Sir NIGEL KINGSCOTE, the Earl of Derby, Vice-President, was appointed a Trustee of the Society; and on the motion of Sir JOHN THOROLD, seconded by the Hon. CECIL T. PARKER, Mr. J. H. Arkwright was elected a Vice-President.

On the motion of Sir JOHN THOROLD, seconded by Sir NIGEL KINGSCOTE, the Honorary Membership of the Society was conferred upon the three following distinguished scientists:—

Mr. Alexander Curtis COPE, M.R.C.V.S., Chief Veterinary Officer of the Board of Agriculture, and President of the Royal College of Veterinary Surgeons for 1900–1.

Dr. James Cossar EWART, M.D., F.R.S., Regius Professor of Natural History at the University of Edinburgh.

Professor John MCFADYEAN, M.B., B.Sc., C.M., Principal of the Royal Veterinary College.

Sir JOHN THOROLD also reported that designs had been prepared for the obverse and reverse of a new Medal of the Society, with the effigy of His Majesty the King, Patron of the Society. These designs had been previously submitted to and approved by His Majesty; and the Committee recommended that instructions be now given for the preparation of the dies.

Dairy.

Mr. DUGDALE (Chairman) reported that the Committee had further considered the Report of the Departmental Committee of the Board of Agriculture on Milk Standards, and had resolved:—

> That the standard as proposed by the Majority Report of the Departmental Committee on Milk Standards is, in the opinion of the Committee, too high, unless an average of the morning's and evening's milk is taken into consideration.

Mr. DUGDALE, in formally moving the resolution, said that the Dairy Committee had on several occasions discussed the recommendations of the Departmental Committee appointed by the Board of Agriculture in reference to a milk standard. They realised the great difficulty of fixing one standard for milk which was suitable for all seasons of the year and for all districts, and some members of the Dairy Committee doubted whether it was advisable to have only one standard. They fully appreciated the desire of the Departmental Committee to fix such a standard as would ensure to the consumer milk which was of good quality and genuine. On the other hand, the Dairy Committee felt that in the case of prosecutions such a standard as was proposed might act harshly in the case of farmers, and especially those living in certain upland districts and keeping only a few cows, the milk of which was sold locally. There seemed to be conclusive evidence that in the spring the morning's milk did not come up to the standard, though the evening's milk exceeded it. If, therefore, a farmer was prosecuted for selling the morning's milk he would be liable to conviction, however honest he might be. The Committee were, therefore, of opinion that a farmer's milk should be judged on the average of the twenty-four hours.

The resolution was approved by the Council, and a copy ordered to be sent to the Board of Agriculture.

Retiring Members of Council.

The SECRETARY submitted, in compliance with Bye-law 23 (*c*), the list of Members of Council retiring by rotation but eligible for re-election at the General Meeting to be held Wednesday, May 22, 1901.

Queen Victoria Gifts Fund.

Earl SPENCER, in presenting a report from the Trustees of the Queen Victoria Gifts Fund, said that the Trustees proposed to grant to the Royal Agricultural Benevolent Institution for 1901 the same sum as in previous years, viz., 250*l*., to be distributed in twenty-five grants of 10*l*. each to unsuccessful candidates for the pensions of that Institution in the following proportions:—Five grants to males, five grants to married couples, and fifteen grants to females.

Miscellaneous.

The Report of the Council to the Anniversary General Meeting, to be held on Wednesday, May 22, 1901, at 13, Hanover Square, W., was prepared; and other business having been transacted, the Council adjourned until Wednesday, June 5, at 10.30 a.m.

Proceedings at the Sixty-Second Anniversary Meeting of Governors and Members,

HELD AT THE SOCIETY'S HOUSE, 13, HANOVER SQUARE, LONDON, W.

WEDNESDAY, MAY 22, 1901.

EARL SPENCER, K.G. (TRUSTEE), IN THE CHAIR.

Present:

Trustees.—Earl Egerton of Tatton, Sir Walter Gilbey, Bart., Colonel Sir Nigel Kingscote, K.C.B., Sir John Thorold, Bart., Viscount Ridley.

Vice-Presidents. — H.R.H. Prince Christian, K.G., Lord Moreton, Sir Jacob Wilson.

Other Members of Council.—Mr. Percy Crutchley, the Marquis of Granby, Mr. James Hornsby, Mr. John Howard Howard, the Earl of Jersey, G.C.B., Mr. Henry D. Marshall, Lord Middleton, Mr. Albert Pell, Mr. W. A. Prout, Mr. J. E. Ransome, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr. William Scoby.

Governors.—Sir George Macpherson Grant, Bart., the Rt. Hon. R. W. Hanbury, M.P., Mr. Leopold Salomons, Colonel the Hon. W. le Poer Trench, R.E.

Honorary Members.—Mr. A. C. Cope, Professor J. McFadyean.

Members.—Lord Balcarres, M.P., Sir George J. E. Dashwood, Bart., General Sir F. Fitzwygram, Bart., Sir Edmund Verney, Bart., Mr. Arthur W. Arkwright, Mr. J. G. Barford, Mr. George Barham, Mr. A. Bornemann, Mr. A. M. Brown, Mr. T. Davis Boulton, Mr. H. S. Daine, Mr. T. H. Elliott, C.B., Mr. G. H. Evans, Mr. Henry Walter Gilbey, Mr. W. W. Glenny, Mr. Ernest H. Godfrey, Mr. Hubert J. Greenwood, Mr. John Harrison, Mr. Frederick King, Vet. Colonel J. D. Lambert, C.B., Mr. Jonas Lindow, Mr. G. P. Mitchell-Innes, Mr. Claude M. S. Pilkington, Mr. Francis Pym, Mr. Clare Sewell Read, Mr. Frank Silvester, Mr. J. D. Sims, Mr. R. H. Sutton, Mr. Montagu G. Thorold, Mr. Edward Trimen, Mr. John E. Welby, Mr. T. P. Wilkes, Mr. P. Wroughton, Mr. G. D. Yeoman, &c.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; and Mr. J. E. Compton-Bracebridge, Assistant Director.

The SECRETARY having reported the receipt of a letter from the President (Earl Cawdor)[1] stating that in consequence of the sudden death of his brother-in-law, Sir Courtenay Boyle, he was unable to attend that day, Earl Spencer, K.G. (Trustee), was on the motion of Sir NIGEL KINGSCOTE, seconded by Sir JOHN THOROLD, unanimously called to the Chair.

The SECRETARY having read the Bye-laws governing the transaction of business at the Anniversary General Meetings:

Election of President for 1901–2.

Sir GEORGE MACPHERSON GRANT moved:—"That His Royal Highness Prince Christian, K G., be elected President of the Society for the year following the Cardiff Meeting." He felt certain that no remarks of his or of any other member were necessary to recommend the motion to their acceptance. He might say, however, that on the other side of the Tweed they fully recognised the great services which His Royal Highness had rendered to the Society. The very prominent part which he took in that great Society fully qualified him for the high office which they were about to ask him to accept. [illegible]

Mr. CLARE SEWELL READ said he had the great pleasure and high honour to second the motion. Having served on the Council of the Smithfield Club when H.R.H. Prince Christian was President of the Club, he was quite sure that His Royal Highness would ably discharge the duties that devolved upon him, and in a manner perfectly satisfactory to the members of the Royal Agricultural Society.

The resolution having been put, and carried by acclamation,

The CHAIRMAN said it was his agreeable duty to announce to His Royal Highness that the resolution had been carried unanimously. He had very great pleasure in doing so, because he knew full well what interest His Royal Highness had taken in agriculture, and the admirable manner in which he would fulfil the duties of President.

H.R.H. PRINCE CHRISTIAN said he was much gratified by the honour which they had bestowed upon him by electing him to be President of the Royal Agricultural Society for the ensuing year. He wished also to thank Sir George Macpherson Grant and Mr. Clare Sewell Read for the kind way in which they had proposed and seconded his election. From his earliest youth he had been brought up to country pursuits and to a love of country life, which had made him take the greatest interest in agriculture and farming generally. He could only say that since they had chosen him for their President, he would do his best to follow in the steps of those who had so worthily preceded him in that office. He begged again to thank them for the honour they had done him.

Election of Trustees, Vice-Presidents, and Council.

The twelve Trustees and twelve Vice-Presidents of the Society were re-elected by show of hands. The election of twenty-five Members of Council was then proceeded with, and in accordance with the requirements of Bye-law 23 (*e*), the CHAIRMAN appointed Mr. Claude M. S. Pilkington, Mr. John Sims, and Mr G. P. Mitchell-Innes to act as Scrutineers of the Election Lists. These having been duly collected, and the report of the Scrutineers thereon received, it was announced that the twenty-five Members of Council who retired by rotation had been re-elected.

Election of Auditor.

The CHAIRMAN having announced the retirement of Mr. A. H. Johnson from the position of Auditor owing to failing eyesight, said that Bye-law 22 provided for the appointment of three Auditors by the members of the Society. As it was inconvenient to have only two Auditors it would probably be thought better not to wait until the General Meeting in December, when the Auditors were usually appointed, but to elect a third Auditor at the present Meeting.

Mr. W. W. GLENNY, in moving that Mr. Hubert J. Greenwood, of 28, Chapel Street, Belgrave Square, S W., be elected Auditor in the room of Mr. Johnson, said the members were very much indebted to their Auditors for the time they generously gave to the work of the Society. It was extremely important that the financial statements should be looked through most carefully every year. They regretted losing the services of the retiring Auditor, Mr. Johnson, and more especially since his resignation was caused by ill-health.

Mr. FRANK SILVESTER seconded the motion, and it was carried unanimously.

Report of Council.

The CHAIRMAN said that as the Report of the Council had been printed and circulated amongst all the members, the meeting would probably not require it to be read at length (see page 198). He would, therefore, merely call upon some member to propose a resolution on the subject.

Mr. ALBERT PELL then moved, and Mr. ARTHUR W. ARKWRIGHT seconded, "That the Report of the Council be received and adopted."

Mr. H. S. DAINE expressed satisfaction that for the first time within his recollection the report had been issued anterior to the meeting. He considered that the report was anything but satisfactory; in fact, he looked upon it from four standpoints as most deplorable. It was deplorable owing to their national bereavement by the death of their Queen, and by the deaths of officials and members of the Society who had died for their country. Again, it was deplorable owing to the diminution of the roll of members, and in the financial position of the Society. Death they could not keep back; but the diminution of membership and the financial position of the Society were two points which should be seriously considered. Mr. Daine proceeded to criticise other parts of the report, and asked whether the Show was in future to be a London exhibition and a sort of second Earl's Court. He approved of the publication of the Journal annually instead of quarterly, but was strongly opposed to the decision of the Council on the subject of a Seed Testing Station, giving reasons at some length in favour of a Testing Station as proposed by the Departmental Committee of the Board of Agriculture.

Mr. CLARE SEWELL READ was quite sure that he echoed the regret of every member of the Council and of every other member of the Royal Agricultural Society, that that grand and glorious series of Shows which had been held under the auspices of the Royal Agricultural Society in different parts of the country was to be brought to a close. He quite agreed, on the other hand, that, like all agriculturists, they suffered from a want of funds; and he did not apprehend that there was any great difference between an agricultural society and farmers generally. They had come through good times and bad times in agriculture, and these had befallen this great national Society. He thought that the report was a very melancholy one, yet he believed that on the whole it was an able and courageous report. It was something like the Budget of the Chancellor of the Exchequer. The Chancellor had had an unsatisfactory story to tell, but he had told it so fairly and boldly that he was supported by a large majority. He himself believed that would be the case with the members of the Society when they read that report. There were some portions of it that he would like to criticise, but he would not do it in an unfriendly way. He believed it was a necessity that the Shows which had been for so many years the joy of the British farmer had to be given up, but he did think that it would have been well for the Council of the Royal Agricultural Society to have consulted the members of the Society before they took such an important step. It had been mentioned with satisfaction that they were to have an annual Journal instead of a quarterly one. He must say that to this he resigned himself with complacency, because they now had a very excellent substitute in the quarterly Journal that was issued by the Board of Agriculture, and although it was dull reading, and everybody who hated figures as he hated them would not be inspired by reading it, yet it was very useful. He hoped it would continue, and that it would have a little more reading and a few less figures. He resigned himself also to an annual Journal for this reason, that in their recent issues they had had a series of articles written by brewing chemists against English barley. He hoped that in the next issue of the Journal an article would be written by some pure beer brewer in favour of "John Barleycorn."

The CHAIRMAN said the usual course on these occasions was for the Chairman, after the report had been presented and discussed, to announce that the suggestions made would be referred to the Council for consideration. This would be done on the present occasion, but he might perhaps add two or three words with regard to the interesting speeches which they had heard. The first speaker referred to the financial position and the withdrawal of members. He was not aware that there had been any great difference or change in the management of the Society, and he did not think that any adverse criticism could be made in consequence. No doubt they all deplored the losses the Society had sustained on the last three shows, and those losses had led up to the most important point that had been mentioned—viz., to the proposed change in the arrangements of the Society. He did not know that he had ever said anything on this subject in that room, but he had always regretted the change from a migratory to a stationary Show, as he had always believed that the Society had done an enormous amount of good by holding its Show in various parts of the country that were different from each other, thus enabling them all to see the best of everything that could be produced in various parts of the country. At the same time he did feel that, after the experience they had had, some serious change was necessary, and, therefore, he had voted for and supported the change to which reference had been made. Mr. Daine had asked whether they were going to have a mere London show, a repetition of an Earl's Court show. He thought he was speaking the opinion of the Council when he said that they did not propose to have any such thing. By bringing it to the capital of England, they meant it to be a national Show in which everybody must always take a deep interest. In the Metropolis they would have not merely London shows, but shows that represented the whole country. He trusted and believed that in the future the shows of the Royal Agricultural Society, which had gained such a great reputation, would be as successful as they had been elsewhere. He might say one word with regard to what had fallen from Mr. Read as to the depressed state of agriculture. That had had a good deal to do with the members joining the Society; but he did not think that the diminution in the membership had had anything to do with the necessity of changing the custom of the Society as to its shows. The fact was that there were so many shows in the country, and there had been such an enormous increase in the expenses necessary to carry out what was now required in a Show. They could not always go to a town where there was a large population who would visit the Show, and in that way defray the heavy expenses necessary for it. He was glad to notice that the change with regard to the Journal had been, on the whole, approved. The question of a Seed Testing Station would be referred to the Council, who would give very careful attention to what had been said.

The motion that the report of the Council be received and adopted was then put and carried.

Suggestions of Members.

In response to the usual inquiry from the Chair as to whether any Governor or Member had any remark to make or suggestion to offer that might be referred to the Council for consideration,

Mr. G. D. YEOMAN said that one of the questions he would like to ask was whether it would not have been advisable, before having fixed on a locality for the Show, that the Council should have taken the sense of the general body of members called together for that purpose. It seemed to him that the Committee of the Council, without asking anyone's advice, had taken upon themselves the expense of hiring 100 acres of land within seven miles of the Marble Arch at 1,000*l.* a year for fifty years, which meant, of course, an expenditure of 50,000*l.*

The CHAIRMAN said he did not like to stop a member from speaking, but the question of the selection of the ground had been proposed and carried, and was also dealt with in the report.

Vote of Thanks to Chairman.

The Right Hon. R. W. HANBURY, M.P., said he had been asked to propose a vote of thanks to the Chairman. Whilst they were all very sorry for the necessity of Lord Cawdor's absence, they all agreed that there could be nobody better fitted to take his place than a nobleman with such hereditary associations with the Society as Lord Spencer. He only wished that His Lordship could have taken the Chair upon the occasion of a more satisfactory report. After all, it was perfectly true that the receipts of the Royal Agricultural Society's Show had been falling off of late years. Might not that be attributable to a great extent to the growth of other societies throughout the length and breadth of the country? (Cheers.) Although, owing to the magnitude of the individual local shows, the influence of the mother Society had been to that extent lessened, yet the Society could not fail to be glad that the children had taken up her task and were doing their work so well throughout the country. He might be allowed to congratulate the Society in that he could now say that they had reason to hope that foot-and-mouth disease had practically died out of the country. They had no areas proclaimed at the present moment and they trusted that the outbreak which occurred over a year ago was now extinguished.

He only wished they could say the same with regard to swine fever. It was said that they were not combating it as vigorously as they might. No effort was, however, spared on their part to do battle with it; though they did not receive in the districts affected the support they might have. They were taking steps to meet that difficulty, which he hoped would make them competent to deal with the danger. Mr. Daine had referred to the seed-testing question. That, of course, they were considering at the Board of Agriculture, and he was not going to be "drawn" on the subject that day. He hoped within a few weeks to be able to announce what the milk standard would be. He confessed that it was about as difficult a task as could well be put into the hands of any Department. Whatever their decision might be, they were certain to have a number of grumblers. He hoped also, seeing the way butter was manipulated with water, that they would set to work to inaugurate a butter standard as soon as they had got together sufficient evidence to enable them to do so. He was sure that the vote of thanks would receive an unanimous reception.

Col. the Hon. W. **LE POER TRENCH**, in seconding the motion, said it was a great satisfaction to the Society to feel that they had such distinguished agriculturists amongst their members, and that a man like Lord Spencer was ready to take the Chair. With reference to the permanent location for their Shows, he emphasised the necessity for securing the co-operation of the railway companies, so that people might be brought to the central exhibition from all parts of the country.

The **SECRETARY** then put the motion, which was carried unanimously.

The **CHAIRMAN**, in acknowledging the vote, said he was always glad to be of any assistance he could to the Royal Agricultural Society, and particularly so that day. He might also say that he felt the deepest interest in the Department of Agriculture, having had charge of agriculture on two occasions as Lord President of the Council, and in Ireland he had had a great deal to do with agriculture. He was much gratified to hear Mr. Hanbury express the hope that their old enemy, foot-and-mouth disease, which had been one of the greatest curses to the farmers of this country, was again extinguished.

The proceedings then terminated.

WEDNESDAY, JUNE 5, 1901.

EARL CAWDOR (PRESIDENT) IN THE CHAIR.

Present:

Trustees.—The Earl of Derby, K.G., Sir Walter Gilbey, Bart., Colonel Sir Nigel Kingscote, K.C.B., Earl Spencer, K.G., Sir John Thorold, Bart.

Vice-Presidents. — H.R.H. Prince Christian, K.G., Mr. J. H. Arkwright, the Hon. Cecil T. Parker, Sir Jacob Wilson.

Other Members of Council.—Mr. R. C. Assheton, Mr. J. Bowen-Jones, Lord Brougham and Vaux, Lord Arthur Cecil, Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Colonel Curtis-Hayward, Mr. J. Marshall Dugdale, Mr. S. P. Foster, Mr. William Frankish, Mr. R. M. Greaves, Mr. Alexander Henderson, M.P., Mr. John Howard Howard, the Earl of Jersey, G.C.B., Mr. Henry D. Marshall, Mr. Joseph Martin, Lord Middleton, Mr. T. H. Miller, Mr. P. A. Muntz, M.P., Mr. A. E. Pease, M.P., Mr. Albert Pell, Mr. J. E. Ransome, Mr. Frederick Reynard, Mr. C. C. Rogers, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr. Martin J. Sutton, Mr. Joseph P. Terry, Mr. R. A. Warren, Mr. E. V. V. Wheeler, Mr. J. C. Williams.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton - Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard.

Lord Tredegar; Professor McFadyean.

The following members of the Cardiff Local Committee were also present:—Mr. D. T. Alexander and Mr. George C. Williams.

Apologies for non-attendance were read from Viscount Baring, Lord Moreton, Mr. Alfred Ashworth, Mr. George Blake, Mr. Victor C. W. Cavendish, M.P., Mr. H. Chandos-Pole-Gell, Mr. W. A. Prout, Mr. Henry Smith, Mr. Richard Stratton, and Mr. E. W. Stanyforth.

At the opening of the proceedings, Sir John Thorold, as Chairman of the Committee of Selection, introduced Mr. Alexander Henderson, M.P., who had been elected a Member of Council in April, and who then attended for the first time.

Election of New Governors and Members.

The minutes of the last monthly meeting of the Council, held on May 1, 1901, having been taken as read and approved, the election of the following two Governors and twenty-nine members was then proceeded with:—

Governors.

Ridley, Hon. M. W., M.P...36, Portland Place, London, W.
Hanbury, Right Hon. R. W., M.P...Ilam Hall, Staffordshire.

Members.

Andrews, T...163, Newport Road, Cardiff.
Beadel, M. F...97, Gresham Street, E.C.
Bennett, B...Kensworth House, Dunstable.
Berkeley, C. M...5, Corbett Road, Cardiff.
Bowring, R. A...Rockhill, Keynsham, Bristol.
Clark, J. McC...Haltwhistle.
Clough, C. H...Old Croft, Stanwix, Carlisle.
Corrigan, W. J...Cloughmore, Splott Avenue, Cardiff.
Evans, T...Burdonshill, Wenvoe, Cardiff.
Fitch, C. F...Elm Hurst, Romford.
Harris, H. E...Webberton, Haldon Park, Exeter.
Jackson, R. N...Blackbrooke, Pontrilas, Mon.
Jackson, W...The Hall, Knottingley.
Kelsey, G...Guernsey Road, Sheffield.
Kingwell, J. R. T...Great Aish, South Brent, Devon.
McKenzie, W...Bengairn, Ninian Road, Cardiff.
Mair-Rumley, J. G...The Hammonds, Udimore, Sussex.
Matthews, W. N...Ynisboeth Uchaf Farm, Penrhiwceiber, S.O., Glamorgan.
Mills, J. D...Bisterne, Ringwood.
Morgan, L...Duffryn, Cathedral Road, Cardiff.
Piercy, A. E...Hurst Leigh, Broughton Park, Manchester.
Robotham, E...Staughton Manor, St. Neots.
Seabrook, A...Highlands, Berden, Newport, Essex.
Stanfield, J...Cathedral Road, Cardiff.
Stucley, Sir W. L., Bart...Hartland Abbey, Bideford.
Tatem, W. J...Shandon, Penylan, Cardiff.
Templeton, R...Blackweir Farm, Cardiff.
Veale, R. J...Lostock Hall, Urmston.
Woodward, S...Kingsley, Warrington.

On the motion of Sir NIGEL KINGSCOTE, it was unanimously resolved :—

> That the next election of candidates for membership of the Society take place at the Council Meeting to be held in London on July 31, but that the Secretary be empowered meanwhile to issue to any duly nominated candidate, on receipt of a remittance of 1*l.* (the amount of the annual subscription of a member), a special ticket admitting the candidate to the same privileges as a member during the Cardiff Meeting; the question of the formal election as member of such candidate to be considered by the Council on July 31.

The Reports of the various Standing Committees were then submitted and adopted as below :—

Finance.

Sir NIGEL KINGSCOTE (Chairman) reported that the accounts for the period ended May 31, as certified by the Society's Accountants, showed total receipts amounting to 927*l.* 0*s.* 8*d.*, and expenditure amounting to 2,387*l.* 11*s.* 2*d.* Accounts amounting in all to 9,021*l.* 13*s.* 8*d.* had been passed, and were recommended for payment.

Journal.

Sir JOHN THOROLD (Chairman) reported that copies of the third edition of Sir George Brown's pamphlet on the "Structure of the Horse's Foot," published by the Society in 1892, was now nearly exhausted. Sir George Brown had kindly undertaken to bring the pamphlet up to date, and the Committee authorised the issue of a fourth and revised edition as soon as ready.

With regard to the future conduct of the Journal, the Council would be aware from the recommendation presented by the Committee at the May Council, that it was necessary for an Assistant Editor to be appointed to take charge of the details of the preparation and issue of the Journal; and the Committee had had under their consideration a number of applications which had been received for the post. The most suitable candidate for the appointment appeared to the Committee to be Mr. Ernest H. Godfrey, now Secretary to the Central Chamber of Agriculture, who, the Council would remember, had previously been engaged for eleven years in the Society's service as a clerk. Mr. Godfrey's qualifications, and his previous training in the office, appeared to the Committee to render him a very eligible candidate for the post, and they had therefore unanimously resolved to ask the Council to confirm his appointment as Assistant Editor at a salary of 400*l.* per annum, his duties to commence on October 1, 1901. In addition to the supervision of the details of the Journal under the Secretary, Mr. Godfrey would act as Librarian, and assist the Secretary generally in the literary department of the Society; and if he were appointed he (Sir JOHN THOROLD) felt sure Mr. Godfrey would give the Council every satisfaction.

A formal motion appointing Mr. Godfrey as Assistant Editor was moved by Sir JOHN THOROLD, seconded by Mr. FRANKISH, and carried unanimously.

Chemical and Woburn.

Mr. BOWEN-JONES (Chairman) reported the progress of the various feeding and other experiments which were now taking place at the Woburn Farm. The Committee had had under consideration the arrangements to be made in future for the management of the Farm, and presented a detailed report as to the duties of the Manager to be appointed in the room of the late Mr. J. J. Forrester. They recommended that the new Manager should not be more than thirty years of age, and that his salary should be fixed at 140*l.* per annum, with house, &c. He would be required to enter upon his duties on the 1st of October next, and the Committee proposed to bring up at the next ordinary meeting of the Council, on the 31st July, a recommendation for the new appointment, after consideration of the applications received from candidates. The Committee had fixed their annual visit of inspection to the Woburn Farm for Wednesday, July 10 next.

Botanical and Zoological.

Mr. E. V. V. WHEELER (Chairman) reported that the Consulting Botanist was continuing his investigations into the injury to cherry trees by *Gnomonia*. Orchards in Kent had been visited and many samples had been obtained from various districts. The dead leaves of last year were producing spores, but none of the leaves of this season had yet shown any symptoms of disease. Specimens of "bull bough" in cherries were received by the Consulting Botanist from two districts in Kent. This is caused by a parasitic fungus called *Exoascus*. It was usually limited to one or two branches of the tree, and was more common on wild than on cultivated cherries. The branches should be removed and burnt. No gain was secured if the branches were left on the ground. The "bull bough" may be detected by the red colour and crumpled appearance of the leaves, and the swollen and distorted branchlets. Further injuries had been investigated on peach, rose, and tulip. The Consulting Botanist had received a communication from the United States Department of Agriculture in regard to seeds of clover grown in England, as they were proposing to institute experiments similar to those undertaken by this Committee.

The Committee had considered the following suggestion made by Mr. H. S. Daine, at the General Meeting:—"That the decision of the Botanical and Zoological Committee not to support the recommendation of the Departmental Committee of the Board of Agriculture for the establishment in this country of a Central Seed Testing Station be reconsidered by the Council," and also a letter from Mr. Daine offering to attend before the Committee. The Committee saw no reason, however, to alter the opinion which they had expressed on April 30, that "In the opinion of this Committee, members of the Society who use the Order Forms for Seeds, which have already been sanctioned by the Council, have all the safeguards they require without the establishment of a Central Seed Testing Station."

Mr. W. A. Prout had been added to the Committee.

The Zoologist had presented the following report:—

REPORT OF ZOOLOGIST.

Among corn pests cases of frit-fly and wheat bulb fly attack have been reported. Winter-moth caterpillars have been received from fruit trees, and specimens of a *phyllobius* beetle (*P. oblongus*) were sent from an orchard where they were alleged to be doing serious harm to the foliage. There is probably no great importance in this attack, as these beetles are generally present to some extent, but do not seem to have been hitherto accused of any noticeable amount of injury.

A case of injury to the trunks of pear trees by the somewhat rare Leopard moth was the subject of one inquiry.

Several other inquiries have had reference to wood-boring insects such as *scolytus* on elms, and the small Sirex-like *Xyphidria dromedaria*, a willow-boring insect, which does not seem to have occurred in this country for many years.

Some grubs sent from the roots of damaged pea plants proved to be those of the "fever fly" (*Dilophus febrilis*), which has occasionally been accused of doing injury, especially to hops. In this case, however, there was ample evidence of attack by the "pea and clover weevils" (*Sitones*), and they were probably responsible for the failure of the crop.

A good deal of time has been devoted to the observation of the black currant gall mite, and some light has been thrown upon the method of its distribution. The matter is still under investigation.

CECIL WARBURTON.

June 4, 1901.

Veterinary.

The Hon. CECIL PARKER (Chairman) read the following report from Professor McFadyean as to the cases of contagious diseases in animals which had been officially reported during the last four weeks:—

ANTHRAX.—During the past four weeks fifty-four outbreaks, with fifty-eight animals attacked, have been notified. During the corresponding four weeks of last year there were fifty-two outbreaks, with eighty animals attacked.

GLANDERS.—During the same four weeks the outbreaks numbered 107, and the animals attacked 197. The corresponding figures for last year were ninety-nine and 182 respectively.

SWINE FEVER.—The alarming increase in the number of outbreaks of this disease, which began in the early part of the year, has been maintained during the past four weeks, in which the outbreaks have numbered 478, as against 237 for the corresponding four weeks of last year. The outbreaks reported for the current year already numbered 1,565, and in connection with these 7,601 pigs have been slaughtered as diseased or exposed to infection. At the same date last year 854 outbreaks had been notified, and 9,249 pigs had been destroyed in dealing with them.

No case of foot-and-mouth disease or rabies has been detected during the past month.

MISCELLANEOUS.—During the month of May, 44 cases of disease were referred to the Research Laboratory at the Royal Veterinary College for examination, and some experiments bearing on the cause of inflammation of the udder in cows have been begun.

Having considered the letter dated April 30, received from the Central Chamber of Agriculture, inquiring whether the Royal Agricultural Society would be willing to join with the Central Chamber and other bodies in a deputation to the President of the Board of Agriculture, to urge upon him the necessity for dealing with foot-and-mouth disease and swine fever by the "uniform slaughter of all affected animals, and of those in contact with them," the Veterinary Committee were of opinion that, under existing circumstances, no advantage would be gained by the participation of the Society in the proposed deputation.

Mr. J. BOWEN-JONES said that whilst he did not propose to canvass the opinion expressed by the Veterinary Committee in their report, he hoped that their decision not to take part in the deputation to the President of the Board of Agriculture did not imply that the policy which the Society has always advocated with regard to dealing with outbreaks of contagious diseases of animals was to be departed from. It was obvious from the information which had been collected by the Central Chamber of Agriculture that the system of uniform slaughter in the case of outbreaks of swine fever had not been consistently carried out by the Board of Agriculture, and that recently, in an increasing number of cases, the Board had had resort to isolation instead of exercising their powers of slaughter and compensation under Section 16 of the Diseases of Animals Act, 1894. The reference in Professor McFadyean's Report to the Veterinary Committee to the alarming increase in the number of outbreaks of swine fever which began in the early part of the year having been maintained during the past four weeks, appeared to him (Mr. Bowen-Jones) to indicate the necessity for pressure being brought upon the Board of Agriculture to abandon the system of isolation—which, in his view, was responsible for this increase—and to exercise their powers of slaughter under the Act of 1894.

The Hon. CECIL PARKER hoped it would not be supposed that the Veterinary Committee had at all changed their views as to the proper method of dealing with these diseases. All their recommendation was intended to imply was that, with the information before them, they did not see their way to endorse all the views expressed in the Report of the Cattle Diseases Committee of the Central Chamber, dated April 29, which, he gathered, was to be the basis of the deputation to the Board of Agriculture, particularly those relating to the action of the Board with regard to foot-and-mouth disease. The swine fever question was understood to be receiving the personal attention of the President of the Board, and the Committee did not consider it necessary at this moment to again emphasise the views of the Society on this point, with which the Board were already familiar.

Sir JACOB WILSON thought on general grounds that the subjects of swine fever and foot-and-mouth disease should not be included in the same deputation, as they were two entirely different diseases.

Sir NIGEL KINGSCOTE quite sympathised with Mr. Bowen-Jones's anxiety that it should be made clear that the Society had not changed its policy as to the repression of these diseases; but with regard to the particular invitation before them, he thought it would be better to wait a while and leave the Board of Agriculture alone for the present.

The Report of the Veterinary Committee was then adopted.

Stock Prizes.

Mr. SANDAY (Chairman) presented a tabular statement showing the entries of live stock, poultry, and produce at the forthcoming Meeting at Cardiff compared with those of previous years.

Judges Selection.

Mr. SANDAY (Chairman) reported that letters had been received from two Judges, intimating their inability to act at the Cardiff Meeting, and instructions had been given for filling up their places.

Implement.

Mr. FRANKISH (Chairman) reported that a communication had been received from the Great Western Railway Company, intimating that the cartage charges in connection with the Cardiff Meeting had been reduced from 5*s.* to 3*s.* 6*d.* per ton.

Cardiff Meeting, 1901.

Sir WALTER GILBEY reported that the following Time Table for meetings of Breed and other Societies in the large tent in the showyard had been settled by the General Cardiff Committee:—

Wednesday, June 26.

English Kerry and Dexter Cattle Society, 2 p.m.
Shropshire Sheep Breeders' Association, 3 p.m.

Thursday, June 27.

Hackney Horse Society, 11.15 a.m. to noon.
ROYAL AGRICULTURAL SOCIETY, 12.30 p.m.
Shire Horse Society (Lower End), 2 p.m. to 3 p.m.
Shorthorn Society (Upper End), 2.30 p.m. to 4 p.m.
Polo Pony Society (Lower End), 3 p.m. to 4 p.m.
National Pig Breeders' Association (Upper End), 4 p.m. to 5 p.m.

Friday, June 28.

University College of Wales Agricultural Society (Upper End), 11.30 a.m.
Radnorshire Agricultural Society (Lower End), 12 noon.
Hunters' Improvement Society (Upper End), 2 p.m.
Large Black Pig Society (Lower End), 2 p.m.
Welsh Pony Society, 3 p.m.

Showyard Works.

Sir JACOB WILSON (Chairman) reported that the Committee had considered a letter from the Secretary of the Cardiff Horse Show, proposing to hold the Horse Show in a portion of the ground occupied by the Society's showyard at Cardiff. The Committee recommended that the matter be left for settlement in the hands of the Honorary Director and Mr. Sanday.

Selection.

Sir JOHN THOROLD (Chairman), having read the recommendations of this Committee, formally moved:—

> That Mr. William Scoby, of Hobground House, Sinnington, York, be elected a member of the Council, in the room of Mr. Arkwright, appointed a Vice-President of the Society.

The motion was seconded by Sir JACOB WILSON and carried unanimously.

The Committee had given instructions for a new design for the Diploma of Honorary Membership of the Society to be prepared.

On the motion of Sir JOHN THOROLD, seconded by Mr. PERCY CRUTCHLEY, Mr. S. P. Foster was appointed Steward of Forage, and Mr. R. C. Assheton Steward of Dairying, for the Society's Carlisle Meeting of 1902.

Education.

Mr. J. MARSHALL DUGDALE, in the unavoidable absence of the Chairman, reported that the second Examination for the National Diploma in Agriculture, conducted under the auspices of the National Agricultural Examination Board, had taken place at the Yorkshire College, Leeds, from the 6th to the 8th May last. Of the seven candidates who, having passed Part I. of the examination last year, were eligible to compete this year in Part II., six had presented themselves, and the following five,—Messrs. Albert William Oldershaw, John Montgomerie Hattrick, Bernard William Bull, Simon Blore, and Thomas Young—had been successful in gaining the Diploma. Forty-two candidates had entered their names for Part I., of whom forty presented themselves for examination, and twenty had been successful in passing in that Part.

Dairy.

Mr. DUGDALE (Chairman) reported that 154 entries of butter, 77 entries of cheese, and 118 entries of cider and perry had been received for the Cardiff Meeting, and submitted the Committee's recommendations as to the judging of these classes.

Special Show.

The Hon. CECIL PARKER (Chairman), in presenting a further report from the Special Show Committee, said it would be in the recollection of the Council that at the last meeting, when the proposals of the Committee for a lease by the Society of the land between Willesden and Ealing (which had been selected as the site for the permanent showyard) were under discussion in Committee, several members of the Council had spoken in favour of the Society acquiring the freehold of the 100 acres which it required, in preference to entering into a lease. In view of the opinions then expressed, the Committee had since held several further meetings, and were happy to be able to announce that they had now been able to secure the offer of the freehold of 100 acres of the site at the cost price of 250*l.* per acre, viz., 25,000*l.*, plus a contribution of 1,000*l* towards the cost of making the road, which was an essential part of the scheme. It was obvious that the Society was not in a position to purchase, without financial assistance, the site in question, but the Committee felt that the offer which they had received was so exceptional that every effort should be made to take advantage of it. They recommended, therefore, that an appeal should be made to those interested in the National Agricultural Show, and in the success of agriculture in this country, for gifts of money towards the cost of acquiring its permanent showyard, for which, and the incidental expenses, a sum of not less than 30,000*l.* was required. Mr. Parker added that he hoped that, as it was necessary to come to a decision without delay as to the acceptance of the offer mentioned in the report, every member of Council would use his personal efforts in obtaining contributions towards the fund which it was proposed to raise for the purchase of the site.

Miscellaneous.

Authority having been given for affixing the Society's Seal to an agreement with the Corporation of Carlisle for the holding of the Meeting of 1902 in that city, and other business having been transacted, the Council adjourned.

Permanent Show Fund.

The following letter from the Keeper of His Majesty's Privy Purse was, by command of the King, addressed to Sir Walter Gilbey with reference to the Fund referred to in the above report of the Special Show Committee:—

[COPY.]

Marlborough House,
Pall Mall, S.W.:
June 6, 1901.

DEAR SIR WALTER GILBEY,—I have given the King a full account of the conversation I had with you and Mr. Cecil Parker the day before yesterday, and His Majesty has also read in this morning's paper an account of the proceedings of the Royal Agricultural Society at the monthly meeting of the Council which took place yesterday.

I now write by command of the King to ask you to let it be made known to the Council with what interest and satisfaction His Majesty learns the decision of the Council to purchase outright the freehold property of 100 acres between Willesden and Ealing, which has been offered to the Society *on such very generous and favourable terms.*

The King quite sees that the Society is not in a position to purchase the site without financial assistance from the outside world. His Majesty is, however, not only hopeful, but confident, that the £30,000 required for this good object will soon be forthcoming from those interested in the great National Agricultural Show and in the success of agriculture generally.

Although His Majesty is no longer able to continue to take the active part in the management of the Society which he has hitherto done, having four times been President and for twenty-two years a Trustee, still His Majesty will never cease to take the greatest interest in its welfare, and it will be a source of great pleasure to him to learn that the £30,000 required for the purchase of the site may soon be forthcoming.

As a donation to the fund I am commanded by His Majesty to ask you to put him down as a subscriber of two hundred and fifty guineas.

I remain, dear Sir Walter,
Yours truly,
(Signed) D. M. PROBYN.

Sir WALTER GILBEY, Bart.

Proceedings at General Meeting of Governors and Members,

HELD IN THE LARGE TENT IN THE SHOWYARD AT

THE CARDIFF MEETING.

THURSDAY, JUNE 27, 1901.

EARL CAWDOR (PRESIDENT) IN THE CHAIR.

Present on the Platform:

Trustees. — Sir Walter Gilbey, Bart., Col. Sir Nigel Kingscote, K.C.B., and Sir John H. Thorold, Bart.

Vice-Presidents. — H.R.H. Prince Christian, K.G., Mr. J. H. Arkwright, the Earl of Coventry, Lord Moreton, the Hon. Cecil T. Parker, and Sir Jacob Wilson.

Other Members of Council.—Mr. R. C. Assheton, Mr. J. Bowen-Jones, Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Col. J. F. Curtis-Hayward, Mr. Alfred Darby, Mr. J. Marshall Dugdale, Mr. William Frankish, Mr. R. M. Greaves, Mr. R. Neville Grenville, Mr. James Hornsby, Mr. John Howard Howard, the Earl of Jersey, G.C.B., Mr. Henry D. Marshall, Mr. T. Horrocks Miller. Mr. F. Reynard, Mr. H. P. Ryland, Mr. W. Scoby, Mr. R. Stratton, Mr. Martin J. Sutton, Mr. Garrett Taylor, Mr. Joseph P. Terry, Mr. J. C. Williams, and Mr. C. W. Wilson.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; and Mr. J. E. Compton - Bracebridge, Assistant Director.

Lord Windsor (Chairman of the Cardiff Local Committee), the Mayor of Cardiff (Mr. T. Andrews), Mr. D. T. Alexander, Captain S. A. Brain, Mr. R. Forrest, and the Town Clerk of Cardiff (Mr. J. L. Wheatley) were also present on the platform, and there was a large attendance of the general body of Members in the tent.

Vote of Thanks to the Mayor and Corporation of Cardiff.

H.R.H. Prince CHRISTIAN, K.G., in moving the first resolution, "That the best thanks of the Society are due and are hereby tendered to the Mayor and Corporation of Cardiff for their cordial reception of the Society," spoke as follows:—

This resolution has been put into my hands as President-Elect of the Society, and I need not say how great an honour I consider it that my election, which was proposed by the Council, was confirmed at the last General Meeting, an honour which is all the greater as the Show in 1902 will be the last to be held prior to the establishment of a permanent showyard. We all regret the necessity for that step, altering as it does the present system, which gives us an opportunity of enjoying such hospitality as has been extended to us by our hosts at Cardiff. I will not enter into the reasons for this change, as they have been already explained so fully on former occasions. I have much pleasure in proposing a hearty vote of thanks to the Mayor and Corporation of Cardiff for their exertions, which have made the Meeting such a great success. We have all observed with admiration the beautiful decorations in our honour. I may perhaps remind you that it is nearly thirty years since the Society's last visit to Cardiff, when that well-known sportsman and great landlord, the late Sir Watkin Wynn, was President, and we had, on the whole, a highly successful Show. The Corporation and the Local Committee have strained every effort to make the present Show just as successful. (Cheers.) I wish to thank the Mayor and Corporation on my own behalf for the kind way in which they have received me, and I much regret that unfavourable circumstances have prevented me from availing myself of the proposed official reception. I shall always remember with gratitude my pleasant visit to the ancient and historic borough of Cardiff. (Cheers.)

The Earl of **Coventry** seconded the resolution which had been so ably proposed by His Royal Highness Prince Christian, and said he was quite sure that the members of the Society had derived great pleasure from their visit to Cardiff, and that that pleasure had been much increased by the cordial way in which they had been received by the Mayor and Corporation. They would all of them carry away very pleasant recollections of their visit, and they heartily thanked the Mayor and Corporation for the hospitality they had shown.

The motion having been carried by acclamation,

The **Mayor** of **Cardiff** (Mr. T. Andrews) responded, and said that, as Cardiff was the first port in the world for tonnage, they would not be satisfied unless they had a record attendance, which he prophesied they would have. They had had the pleasure of welcoming several members of the Royal Family who were freemen of Cardiff, and if His Royal Highness should come to Cardiff again they would be delighted to offer him the Freedom of the Borough. The Corporation would always welcome the Royal Show and any of its members, and he congratulated them upon having such glorious weather.

Vote of Thanks to the Cardiff Local Committee.

Sir **Walter Gilbey** moved "That the best thanks of the Society are due and are hereby tendered to the Cardiff Local Committee for their exertions to promote the success of the Meeting." He had been connected with the Society for many years, dating back to the last Show at Cardiff, and he should remember the present Show as one of the most pleasant visits in his life. Attending the Royal Show had been one of his holidays for forty-five years. He moved the resolution as having been Chairman of the General Cardiff Committee at which the local representatives attended in Hanover Square, and he had never had a more pleasurable duty to perform. There had been not one single hitch, and that showed what care and judgment had been exercised in sending men who knew how to give and take, and who had conducted the business of the meetings in such a manner that it had given him great pleasure to preside over them. He might add that Cardiff had been a sort of restorer to him, for he had been at various places trying to obtain health during the past four months, and he had never felt better in his life than at Cardiff. (Laughter and cheers.)

Mr. **Percy Crutchley** (Honorary Director) seconded the resolution, and said that when he told them that two years ago a great part, if not the greater part, of the showyard was under the plough, they would appreciate better the success of the efforts of the Local Committee. Many of them might envy the inhabitants of Cardiff the ease with which they laid down their land to grass (Laughter.)

The motion having been carried unanimously,

Lord **Windsor**, as Chairman of the Local Committee, replied, and said that they in Cardiff would have been ashamed of themselves if they had not felt confident of being able to overcome the difficulties that had presented themselves.

Vote of Thanks to the President.

No one rising in response to the usual inquiry as to whether any Governor or Member had any remark to make or suggestion to offer for the consideration of the Council,

Mr. **J. B. Cookson** moved a vote of thanks to Earl Cawdor for his services as President during the last year. He had known him personally for many years, and was very glad to see him in this position, and to know the excellent way in which he had carried out his duties as President of that great Society. Lord Cawdor was a very busy man, for he had not only given up his time as President of the Society, but he was Chairman of the Great Western Railway. He (Mr. Cookson) knew nothing of that gigantic business beyond the fact that it had brought him there in a very comfortable manner. (Cheers.)

Mr. GEORGE ADAMS having seconded,

The SECRETARY put the motion, and declared it to be carried unanimously.

The PRESIDENT, in reply, said he was very grateful indeed to the meeting for their kind vote of thanks, and especially to Mr. Cookson, his old schoolfellow and friend, and to Mr. Adams for the kind words which had fallen from them. He was glad that the Great Western Railway had, at any rate, succeeded in conveying those two gentlemen comfortably to the Show. He hoped that many others would attend, and it was, at all events, the wish of the Company that everybody should come to Cardiff and, if necessary, leave Cardiff in the most comfortable way it was possible to arrange. He felt deeply the honour of being President of that great Society. No one, indeed, need hesitate to admit pride in holding that position when he looked back upon the last sixty years, and found his name amongst those who had occupied the position of President. His duties as President had not been of a very onerous character, for he had received an immense amount of assistance from the officials and from his loyal colleagues on the Council, and this had made the work of the Society a very pleasant pastime.

The past year had proved a very important one in the interests of the Society. They had taken a step of immense importance—a step which many of them, himself included, would have been glad to think could have been avoided—he meant the establishment of their showyard on a permanent site. No one was more attached to the wandering habits of the Society than himself, as they were thus brought into contact with many people and counties, and had the opportunity of indulging in and enjoying the hospitality of all the larger and most populous places. But those who had to study this question could not deal with it by the light of their own fancies and wishes. They had to deal with it by the light of the facts of the case, and these brought to them distinctly and decidedly the obligation to do what they had done, and to decide upon a permanent showyard, which he could only trust might be as successful as many of the shows that had been held in large centres of population.

They had made an appeal to members of the Society and others interested in agriculture to assist them to raise the capital sum to enable them to make a start. They had asked for the modest sum of 30,000*l*., and he had no doubt that the public would give a great deal more. The larger the amount the firmer would be the basis upon which they would be able to start. Already generous contributions had been received, great and small, and the list was headed by His Majesty the King. (Cheers.) His Royal Highness Prince Christian was also one of the generous contributors to the fund. (Cheers.) He (Lord Cawdor) had received intimations in the short time since the Show opened from nine of the large agricultural implement makers that they were sending a contribution of 250*l*. each. (Cheers.) He only trusted that that example would prove very infectious. An immense amount of preparation and thought had been given to this matter of a permanent site by those whose duty it was to do so as representing the Society upon the Council, and who were responsible in the matter. He could assure them that the question had not been lightly taken up without full thought of the surroundings of the case, and what they had done was in the best interests of the Society itself.

A word of thanks in addition to what H.R.H. Prince Christian had said as to the kindness of the Mayor and Corporation, to whom they were all deeply indebted. Not only was it a pleasure to drive through Cardiff to see the beautiful decorations, but in all the previous discussions and negotiations the local representatives, being good business men, had met the Society fairly and well, and where there was any difficulty to pull through they had put their backs into it and pulled it through. (Cheers.) Cardiff had another recommendation. He had known it for many years, but it was now firmly established as one of the chief of British health resorts. (Laughter.)

One word of deserved gratitude to the Press. What they had done in their way—and a very important way it was—in endeavouring to forward the interests of the Society and of the Meeting deserved their very grateful thanks. He thanked the meeting for their kind vote, and only hoped that those who came after him would have as pleasant a time as President as he had had in the past year. His Lordship concluded by formally moving, "That His Royal Highness Prince Christian, K.G., be respectfully asked to take the Chair as President after the conclusion of the present Meeting."

Sir JOHN THOROLD seconded, and the motion having been adopted,

H.R.H. Prince CHRISTIAN briefly replied, saying that he should try to follow in the footsteps of his noble friend, Lord Cawdor, and to discharge the duties as well as he had done. (Cheers.)

The proceedings then terminated.

Proceedings of the Council.

WEDNESDAY, JULY 31, 1901.

H.R.H. PRINCE CHRISTIAN, K.G. (PRESIDENT), IN THE CHAIR.

Present:

Trustees.—Earl Cawdor, the Earl of Derby, K.G., Sir Walter Gilbey, Bart., Earl Spencer, K.G., Sir John Thorold, Bart.

Vice-Presidents.—Mr. J. H. Arkwright, Mr. H. Chandos-Pole-Gell, the Earl of Feversham, the Right Hon. Sir Massey Lopes, Bart., Lord Moreton, the Hon. Cecil T. Parker, Sir Jacob Wilson.

Other Members of Council.—Mr. J. Bowen-Jones, Lord Brougham and Vaux, Mr. Percy Crutchley, Mr. J. Marshall Dugdale, Mr. R. M. Greaves, Mr. James Hornsby, Mr. John Howard Howard, Capt. W. S. B. Levett, Mr. Henry D. Marshall, Mr. P. A. Muntz, M.P., Mr. Albert Pell, Mr. W. A. Prout, Mr. J. E. Ransome, Mr. Frederick Reynard, Mr. G. H. Sanday, Mr. Alfred J. Smith, Mr. E. W. Stanyforth, Mr. Garrett Taylor, Mr. R. A Warren, Mr. E. V. V. Wheeler, Mr. J. C. Williams.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton-Bracebridge. Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard.

Professor Sir George Brown, C.B.; Professor McFadyean.

The following members of the Carlisle Local Committee were also present:—The Mayor of Carlisle (Mr. John Hurst), Mr. F. P. Dixon, Mr. Joseph Harris, Mr. Henry C. Howard, and Mr. A. H. Collingwood (Town Clerk).

Apologies for non-attendance were received from the Earl of Coventry, Lord Middleton, Colonel Sir Nigel Kingscote, K.C.B., Mr. R. C. Assheton, Mr. Victor C. W. Cavendish, M.P., Lieut.-Colonel J. F. Curtis-Hayward, Mr. Martin J. Sutton, and Mr. C. W. Wilson.

H.R.H. Prince CHRISTIAN, in taking the Chair for the first time as President, expressed the pleasure which it gave him to preside, and asked for the kind support and indulgence of the Council in the performance of his Presidential duties.

Minutes of Previous Meetings.

The minutes of the last Monthly Meeting of the Council, held on June 5, 1901, were taken as read and approved, and the minutes of the Special Council Meetings held in the showyard at Cardiff from June 26 to July 1, 1901, were read and confirmed. The minutes of the Special Council Meetings related principally to matters of detail connected with the administration of the Cardiff Show.

On Wednesday, June 26, it had been reported that nine of the leading implement makers (Messrs. Aveling and Porter, Clayton and Shuttleworth, John Fowler and Co., Richard Garrett and Sons, Harrison McGregor and Co., R. Hornsby and Sons, J. and F. Howard, Marshall Sons and Co., and Ransomes, Sims and Jefferies) had agreed to contribute the sum of 250*l.* each to the Permanent Show Fund.

On Friday, June 28, the General Carlisle Committee had been constituted of the whole Council, together with the following eight local representatives nominated by the Council of the City of Carlisle:—The Mayor of Carlisle, Mr. B. Scott, Mr. W. I. R. Crowder, Mr. George White, Mr. F. P. Dixon, Mr. H. C. Howard, Mr. Joseph Harris, and Mr. A. H. Collingwood (Town Clerk).

On Saturday, June 29, it had been unanimously resolved, on the motion of Sir WALTER GILBEY (Chairman of the General Cardiff Committee), seconded by Mr. PERCY CRUTCHLEY (Honorary Director):—

"That the best thanks of the Society are due and are hereby tendered:—

(*a*) To Lloyds Bank Limited, Cardiff, for the efficient assistance rendered by them during the Cardiff Meeting;

(*b*) To the Borough of Cardiff Police, for the efficient assistance rendered by them in connection with the Cardiff Meeting;

(*c*) To the Great Western Railway and to the Local Railway Companies, for the facilities afforded in connection with the Cardiff Meeting;

(*d*) To the St. John Ambulance Association, for the efficiency of the ambulance arrangements in the showyard during the Cardiff Meeting;

(*e*) To Messrs. Shand, Mason and Co., of Upper Ground Street, Blackfriars Road, S.E., for the provision of fire engines, and for their efficient arrangements in connection with the fire station in the showyard;

(*f*) To the officials of the Cardiff Post Office for the efficient postal and telegraphic arrangements;

(*g*) To Messrs. Spiridion and Sons of Cardiff, for the supply of clocks at the entrances, pavilions, and offices;

(*h*) To Messrs. Marshall, Sons and Co., Limited, of Gainsborough, for the loan of a steam engine for supplying the motive power to the Dairy; and

(*i*) To the Glamorganshire Agricultural Society for the loan of two turnstiles."

Letters of thanks had also been ordered to be addressed to various other firms who had rendered assistance in connection with the Cardiff Meeting The President (Earl Cawdor) had undertaken to express by personal letter the special thanks of the Society to Lord Tredegar and to Mr. Robert Forrest, Agent to Lord Windsor, for the invaluable assistance which they had rendered in connection with the preparations for the Cardiff Meeting; and letters of thanks had been ordered to be addressed to Mr. D. T. Alexander, Mr. E. W. M. Corbett and others who had rendered valuable local help in connection with the Show. A letter had been ordered to be addressed to the Chief Commissioner of Police, conveying the appreciation of the Council of the very efficient services rendered by the detachment of the A Division of the Metropolitan Police at the Cardiff Meeting.

Election of New Governors and Members.

The above minutes having been confirmed, the election of the following two Governors and sixty-four members was proceeded with:—

Governors.

Cox, Fred...Harefield Place, Uxbridge.
Neeld, Col. Sir Audley D., Bart...37, Lowndes Street, S.W.

Members.

Allsop, B. J...Cors-y-Gedol Hotel, Barmouth.
Atkinson, P. L...Red Holme Ho., Llanbethery, Cowbridge.
Barton, R. C...Glendalough House, Annamoe. Greystones, co. Wicklow.
Beaven, E. S. Warminster.
Blaauw, H. T. G...Heathlands, Grove Road, Bournemouth.
Blackwell, A. E...Brookshill, Harrow Weald.
Brain, S. A...Roxburgh, Penarth.
Briggs. J. T...Willow Hall, Thorney, Peterborough.
Burgess, W. H...Weaverham, Northwich
Burton, Col. Henry..Newport, Mon.
Chandler, J. M...Bramcote Hall, Atherstone.
Cory, Clifford J...Llantarnam Abbey, Mon.
Cory, J. H...Coryton, Whitchurch, Cardiff.
Cousins, H...St. Mary's Street, Cardiff.
Cullen, Wm. H...Newlands, Llanishen, Cardiff.
Daniel, J...10, Park Street, Selby.
Davidson, R. G...Hickstead Place, Haywards Heath.
De Courcy, Hon. R. C. S...Radyr, Cardiff.
Dugdale, J. Percy..Llwyn, Llanfyllin, Mont.
Ellis, A...278, Newport Road, Cardiff.
England. R...Rumney Court, Cardiff.
Evans, D...Caia, St. Nicholas, Cardiff.
Evans, O. T...Burdonshill, Wenvoe, Cardiff.
Evans, R. Y...14, Park Place, Cardiff.
Evans, Mrs. R. Y...14, Park Place, Cardiff.
Evans, W...59, Conway Road, Cardiff.
Fages, J. L...Corrientes, 4580, Buenos Aires.
Fox, R. J...Sibthorpe, Newark.
Hadley, E. B...20, Upper Park Fields, Putney.
Harpur, W...The Town Hall, Cardiff.
Harrison, Capt. W. B...Aldershaw, Lichfield
Harrison-Broadley, H...Welton House, Brough.
Heywood, T. M...Thornlie Bank, Cardiff.
Holford, J. P. W. G...Buckland, Bwlch, Brec.
Hunt, W...18, Thorney Hedge Road, Gunnersbury.
Jackson, J. C...4, King's Bench Walk, E.C.
Jenkins, E...Frondeg Villa, Llantwit Vardre, Glamorgan.
Kay, H . Boverton, Glamorgan.
Lawrence, A...Lavernock House, Penarth.
Lewis, E. D...6, Working Street, Cardiff.
Lewis, Gething...12b, Cathedral Road, Cardiff.
Lewis, W. H...Bryn Rhos, Llanishen, Cardiff.
Olivera, Ed. A...R.A. Coll., Cirencester.
Parker, A. J...445, London Road, Sheffield.
Pike, J...King Edw. VI. School, Chelmsford.
Platts, W...Fairmount, Bingley.
Quigley, E...1, Westbourne Crescent, Cardiff.
*Ryland, T. Kirkland...Tockington, Glos.
Saunderson, H. P...Littledale, Kempston, Bedford.
Shipway, Lieut.-Col. Robert Wm...Grove Park, Chiswick.
Smedley, J. B. M...Lea Green, Matlock.
Stewart, A. C...14, Neville Street, Cardiff.
Tamlin, W...Sheen Park, Richmond, Surrey.
Tempest, Sir Tristram T., Bart...Tong Hall, Drighlington, Bradford.
Tiarks, H. A...Webbington, Axbridge, Somerset
*Trepplin, E. C...Stoke Court, Taunton.

* Re-elected under Bye-law 12.

WARE, W...Cwm-wb-wb...Caerphilly, Glamorgan.
WATSON, T. E...Newport, Mon.
WHITEHEAD, Walter...17, Market Street, Manchester.
WILLIAMS, E...2, Richmond Terrace, Cardiff.
WILLIAMS, T...Hawthorn Villa, Pentyrch, Cardiff.
WILLIAMSON, R. S...Cannock Wood House, Hednesford, Staffs.
WILLS, C Avongrove, Sneyd Park, Bristol.
YORWERTH, T. J...High Street, Cowbridge, Glamorgan.

The Reports of the various Committees were then presented and adopted as below :—

Finance

Mr. CRUTCHLEY (in the absence through bereavement of the Chairman, Sir Nigel Kingscote) reported that the accounts for the period ended June 30, 1901, as certified by the Society's Accountants, showed receipts amounting to 1,477*l.* 0*s.* 6*d.*, and expenditure amounting to 9,021*l.* 13*s.* 8*d.* The accounts for the period ended July 27, 1901, showed receipts amounting to 7,719*l.* 1*s.* 2*d.*, and expenditure amounting to 1,837*l.* 1*s.* 8*d.* Accounts amounting in all to 9,638*l.* 2*s.* 4*d.*, relating to the Cardiff Meeting, and to 2,655*l.* 8*s.* 5*d*, arising out of the ordinary business of the Society, had been passed and were recommended for payment.

On the motion of Mr SANDAY, seconded by Mr. CRUTCHLEY, it was resolved :—

> That in view of the desirableness of winding up as early as possible the accounts for the Cardiff Meeting, authority be given to the President, the Chairman of the Finance Committee, and the Secretary, to issue during the recess orders upon the Society's Bankers for the payment of accounts connected with the Show.

Permanent Show Estate.

The Hon. CECIL PARKER suggested that, as there were matters of finance dealt with in the Report which it would be his duty to submit as Chairman of the Special Show Committee, it might be convenient for that Report to be now taken. The whole of the members of the Special Show Committee were present at a meeting held on the afternoon of Monday, the 29th instant, and the Committee were unanimous in making the following recommendations for adoption by the Council :—

The Committee beg to report that the public appeal for gifts of money for the cost of acquiring a permanent showyard for the Society, to which reference was made in their report presented and approved by the Council on June 5, was issued in the second week in June, and they have the pleasure to announce that towards the £30,000 asked for in the appeal, a total sum of £24,975 has already been promised.

As the purchase of the land has to be completed at Michaelmas the Committee recommend that authority be given to the Society's solicitors to take legal steps for the preparation of the necessary agreements with the purchaser of the entire estate, and with the Great Western Railway Company, and for the transfer of the freehold into the name of the Society.

The Committee recommend that steps be now taken to collect the subscriptions promised, the moneys to be paid into a separate account at the London and Westminster Bank in the name of the Society; such account to be drawn upon as required for payment of the purchase money for the land by the signatures of (1) the President (or, in his absence from England, the Chairman of the Finance Committee), (2) Sir Walter Gilbey (Honorary Treasurer of the fund) or another Trustee, and (3) the Secretary.

A letter was read from the General Manager of the Great Western Railway Company, explaining the proposals of that Company with regard to the provision of a railway station, sidings, and other facilities in connection with the site; and the Committee recommend that the thanks of the Council be sent for the cordial manner in which the Great Western Railway Company have co-operated with the Society in this matter.

The Committee recommend that authority be given to a sub-committee, consisting of the Chairman, Sir Walter Gilbey, Sir Nigel Kingscote, Mr. Crutchley, and Mr. Sanday, to take any action which may prove necessary during the recess with regard to the site and matters connected therewith.

The Committee think it desirable that all matters connected with the administration of the Permanent Show Estate should in future be delegated to a separate Committee; and they accordingly give notice, under Bye-law 38, that at the November meeting a resolution will be submitted for the creation of a Site Committee of the Council.

The Secretary read a letter dated July 29, which he had received that afternoon from Mr. Martin J. Sutton, with regard to the permanent Show question; and the Committee recommend that the Secretary be instructed to reply that the Council are not prepared to rescind the decision at which they have already arrived as to the Twyford site for the Society's permanent showyard.

Mr. PARKER said that as the Council would doubtless wish to have before them the exact terms of the letter to which the Committee referred in their last recommendation, he would ask for this letter to be read before proceeding further.

The SECRETARY then read the following letter, received by him by express delivery at 1.30 on the previous Monday afternoon:—

[COPY.] Henley Park, Oxon.
July 29, 1901.

DEAR SIR ERNEST CLARKE,—As it is stated that all replies to the appeal for pecuniary help recently made by the Council of the R.A.S.E. are to be sent to yourself, I suppose I am right in asking you to kindly place on record that, in the event of the Council, after further consideration, deciding not to spend the money of the Society in adapting the land at Twyford, or any other land, for the purposes of a permanent Show site, but to continue the country Show system as at present, or with such slight modifications as recent experience may call for, I shall be pleased to send a cheque for one thousand pounds (£1,000), either towards the purchase of the Twyford land, or the purchase of any other suitable investment for capital, to form a reserve fund for the Society.

I believe that, if the Council give the matter longer consideration, they will see that, without a distinct mandate from the members of the Society as a result of a referendum, with a revision of the charter, they dare not expend the funds on permanent buildings, &c., on an open-air exhibition ground in London, equipped for all kinds of purposes; and that such action, if taken, would render them liable to legal proceedings on the part of life governors and members.

The proposal to cover the annual charges for interest, up-keep, rates and taxes on a permanent ground (which it is acknowledged no single week's Show could meet), by hiring out the ground for open-air functions and amusements, such as horse shows, gymkhanas, polo and football matches, is not a scheme for utilising the Society's funds coming within the terms of the charter, and would involve the Society in taking part either directly or indirectly in adventures quite foreign to its character. Buildings and fittings must be adapted for all these various purposes, and the money subscribed by members is not legally available.

Those who desire an open-air exhibition ground near London for the horse shows and other functions in which they are interested should form themselves into a syndicate, and spend the £30,000 said to be needed to equip it, rather than hypothecate the funds or prestige of the R.A.S.E. for such a purpose without even consulting the members.

And perhaps the best way to utilise the Twyford site now may be to lease the ground at a good rental to such a syndicate for that syndicate to exploit it as it pleases, subject to the condition that the land should be so laid out and supplied with such buildings as to make it suitable for the holding of the R.A.S.E. Show as often as desired.

The Society would thus secure a welcome addition to its income, escape risk of loss, and keep its capital intact; but could occasionally, say once in five or ten years (or any year when no suitable country site offered), hold a Metropolitan Show, as we did at Battersea and Kilburn, and yet avoid that abandonment of the country Show system which is so unpopular as to threaten the loss of at any rate half of our country members.

I am, yours very truly,
(Signed) MARTIN J. SUTTON.

The Earl of DERBY, observing that Mr. Sutton was not present, asked if any reason had been given by him for his absence from the Council Meeting that day.

The SECRETARY said he had that morning received from Mr. Sutton a letter dated the 30th instant, asking him to "record his apology for non-attendance at Council to-morrow."

Earl SPENCER said that very probably Mr. Sutton was prevented by good reasons from not attending. He (Lord Spencer) had the honour of being in the Chair on several occasions when this matter was discussed and when Mr. Sutton was present. He had always expected Mr. Sutton to make a statement of his views, and on one or two occasions he thought he did so.

Sir WALTER GILBEY said that if Mr. Sutton had been able to attend the Council Meeting that day, he (Sir Walter) would, he thought, have been able to make a complete reply to that gentleman's letter. The whole matter had been thoroughly discussed on numerous occasions before, with Mr. Sutton present; and he did not see that the Council were called on to go over the same ground again in reply to a letter from a member of their own body, in view of the previous debates and decisions which had been fully reported at the time.

Mr. CRUTCHLEY said that it was impossible for the Council to consider an offer of 1,000*l.* on conditions which if accepted would have the effect of misapplying the whole of the 25,000*l.* which had been contributed in response to the appeal made for funds to purchase the site in question for the purpose of a permanent showyard for the Society.

Earl CAWDOR said that if Mr. Sutton had been face to face with them at the Council Meeting that day, several of those present would, no doubt, have wished to say something on the subject that they did not like to say in his absence.

The discussion was continued by Mr. MUNTZ, M.P., Lord FEVERSHAM, Lord Moreton, Mr. Ransome, Mr. Pell, Mr. Sanday, and others.

H.R.H. The President said that he had some doubts as to whether, in view of the decisions already arrived at by the Council, it was strictly in order for the question whether the Society was to have a permanent showyard or not to be reopened; but he thought that the case would be met, if the Council should see fit to adopt the recommendation of the Special Show Committee, that Mr. Sutton should be informed that the Council were not prepared to rescind the decision at which they had already arrived as to the Twyford site for the Society's permanent showyard.

The motion for the adoption of the Report of the Special Show Committee, on being put to the Council, was carried unanimously.

House.

Sir Walter Gilbey reported that various accounts had been passed and referred to the Finance Committee for payment, and that other details connected with the House had been settled.

Journal.

Sir John Thorold (Chairman) reported that the Committee had given detailed consideration to the arrangements for the issue of the next volume of the Journal. Directions had been given as to various suggestions for special articles; and the Committee had had before them a number of photographs of the male champion prize-winners in the horse and cattle classes at the Cardiff Meeting, which were taken in the showyard for the purpose of illustrating the Official Report on the Show.

Chemical and Woburn.

Mr. Bowen-Jones (Chairman) reported that the Committee had made their annual visit of inspection to the Woburn Experimental Farm on Wednesday, July 10, when, in addition to eight members of the Council, the Right Hon. R. W. Hanbury, M.P. (President of the Board of Agriculture), Mr. T. H. Elliott, C.B. (Secretary of the Board of Agriculture), Sir Henry Gilbert, F.R.S., and two Members of the Lawes Agricultural Trust were present as visitors. Visits had also been paid to the Farm by officers of Canadian Experimental Stations, principals of Agricultural Colleges, agricultural chemists in this country, and twenty-one members of the Bedfordshire Chamber of Agriculture. The Consulting Chemist had reported on the present state of the field experiments, and had submitted a proposal for feeding experiments on sheep and bullocks during the coming winter. It had been decided that the experiments on sheep feeding should take the form of giving roots to sheep in full quantity and in limited supply; while that on bullock feeding should be high feeding of cake and corn as against low feeding.

Out of 81 applicants for the post of Manager of the Woburn Experimental Farm, six candidates had been selected and severally interviewed. The Committee had unanimously agreed to recommend that Mr. William Hogg, of Cockle Park Tower, Morpeth, be appointed by the Council as Farm Manager from October 1 next.

Bullock and Sheep Feeding Experiments.

Mr. Bowen-Jones, referring to the proposed experiments with the feeding of bullocks and sheep during the forthcoming winter, said that the object of the Committee was, as far as possible, to make the experiments of a practical character, so that they might be of some use to farmers throughout the country. From his past experience, going as far back as 1868 and 1870, which were very hot and dry years, and in which the root crop was a partial failure, he was of opinion that farmers generally used rather an excess of roots in the feeding of their stock. It was a matter for consideration whether smaller quantities would not meet the requirements of stock feeding as well as the excessive quantities that were given. These experiments would elucidate the value or otherwise of the present practice, and he believed they would be very useful. As to the question of high feeding as against moderate feeding of bullocks in boxes, he thought it would be obvious that from the very high feeding which was adopted from the end of the last century up to the seventies, the practice had been somewhat discredited by the agricultural public in general What they wanted to ascertain by these experiments was whether high feeding would pay as well as low feeding. From what he had seen at Woburn heretofore, the results might be about equal as regards the money value obtained. If, however, the feeding of cattle in the winter paid at all, and equal results could be got by high feeding for a short time as against low feeding for a longer time, it was manifest that it would be better to adopt high feeding rather than low feeding. If that should be the case, a higher class of farming could be continued instead of retrograding to a lower system.

On the motion of Mr. Bowen-Jones, seconded by Mr. Stanyforth, Mr. W. Hogg was formally appointed Manager of the Woburn Experimental Farm as from October 1 next.

Botanical and Zoological.

Mr. Wheeler (Chairman) reported that several fungal diseases were being investigated by the Consulting Botanist, and that the inquiry into the attack on the cherry orchards was still proceeding. Mr. Carruthers stated that a remarkably dry season had happily been prejudicial to the development of the fungus, and a great crop of cherries had been produced. Specimens of cherries injured were found to be attacked not by the *Gnomonia*, which destroyed the leaves, but by a *Cladosporium*, which formed small round or oval patches.

The Zoologist had presented the following report:—

Report of Zoologist.

The pests most frequently complained of during the last month have been the various root maggots. The carrot-fly seems to have been particularly early in its attack, the infested plants being quite small. Cabbages and turnips, especially swedes, are the other crops which have suffered from similar attacks.

Of the corn pests, the frit-fly in oats has been much in evidence, and, as usual, it is the late sown crops which have suffered most severely. One sample of oats sent recently showed damage to the ear due to a second brood of the frit-fly. I have never seen this before, nor has it, I believe, been recorded in this country, though well known in the North of Europe.

In some districts turnips have suffered from the "Diamond Back" moth, which has this year recurred in large numbers. Inquiries have been received with regard to various other pests.

The black currant gall mite has been under daily observation since the spring, and it is hoped that its life-history will soon be known with tolerable accuracy.

Cecil Warburton.

July 30, 1901.

The late Miss Ormerod.

Mr. Wheeler, in presenting the Report of the Committee, said he was sure that he would be expressing the feelings of the Council when he said that it was with deep regret that they had heard of the death, since their last meeting, of a late distinguished officer of the Society—Miss Ormerod—who for a period of ten years was Honorary Consulting Entomologist to the Society. Miss Ormerod had rendered invaluable services to agriculture in directing attention to the ravages of insects on farm crops, and the remedies to be applied for their extirpation. In her the farmers of this country had lost a valuable friend and adviser, and he thought the Council would on that occasion desire to express their appreciation of the great services she had rendered to the Society, and their regret at the loss that agriculturists generally had sustained by her death. (Hear, hear.)

Veterinary.

The Hon. Cecil T. Parker (Chairman) read the following Report by Professor McFadyean on the diseases of animals:—

Anthrax.—During the twenty-nine weeks of this year, for which the returns have been published, the outbreaks of this disease numbered 382, and the animals attacked 538. Precisely the same number of animals were attacked during the corresponding period of last year.

Glanders.—During the same period 726 outbreaks with 1,230 horses attacked have been notified, as against 611 outbreaks and 1,044 horses attacked during the first twenty-nine weeks of last year.

Swine Fever.—Unfortunately this disease is still very prevalent, 2,385 outbreaks having been reported since the beginning of the year. This is an excess of 1,054 outbreaks as compared with the same period of 1900.

FOOT-AND-MOUTH DISEASE AND RABIES.—No case of either of these diseases has been notified during the last three months.

The number of morbid specimens forwarded to the Research Laboratory, Royal Veterinary College, for examination during the past month was forty-one, including the usual variety of bacterial and parasitic diseases.

Various reports by Mr. John Malcolm, F.R.C.V.S., as to the veterinary inspection of animals in the Cardiff Showyard had been received, and the Committee recommended that a letter be written to Mr. Malcolm thanking him for his services at Cardiff. The Committee also recommended that prizes for horse-shoeing competitions should be offered in two classes at the Carlisle Meeting, viz., for shoeing light and heavy horses respectively, the competition to be open as before to shoeing-smiths in the United Kingdom. As the result of the recent examination of candidates for the Society's medals in cattle pathology, Mr. J. Harrison, of Belsfield Cottage, Bowness, Windermere, had obtained first place, and would receive the silver medal, and Mr. F. W. Robards, of Camden House, Dartford, Kent, had obtained the second place, and would receive the bronze medal.

The Committee had considered the statements made by Dr. Koch, of Berlin, at the British Congress on Tuberculosis, held in London last week, as to the immunity of cattle against human tuberculosis, to which statements much public attention had since been directed. The Committee were of opinion that it was of the highest importance that this question should be dealt with without delay. It had hitherto been considered that infective matter from consumptive persons would be dangerous to cattle, and the few experiments which had been recorded in this country—particularly one experiment referred to by Professor Crookshank as having been successfully performed at the Royal Veterinary College—confirmed this view. The doubt could be solved by experiment with tuberculous sputum from the human subject. Should it be shown by these experiments that infective matter from human beings was infective also to cattle, the matter would remain in its present position—*i.e.*, the general conviction of the past would be maintained. If, on the other hand, it should be proved that cattle are not subject to the disease of the human being as the result of inoculation and feeding with the infective matter, agriculturists would, at least, have the satisfaction of knowing that one possible source of danger to their animals was removed. Even in that case, however, it would still be necessary to continue the regulations to prevent the spreading of tuberculosis among animals. The Committee, accordingly, recommended that experiments should be forthwith made at the Royal Veterinary College as to the possibility of infecting bovine animals with tuberculous material from the human subject; and that the sum of 250*l.* be placed at the disposal of the Veterinary Committee for such experiments. The Committee proposed that these experiments should be supervised by a Sub-committee of their number, consisting of Lord Arthur Cecil, Lord Brougham and Vaux, Sir Nigel Kingscote, Mr. Victor Cavendish, M.P., and Mr. Harold Swithinbank.

On the motion of Mr. PARKER, seconded by Sir JOHN THOROLD, a formal motion that the sum of 250*l.* be placed at the disposal of the Veterinary Committee for the proposed Experiments on Tuberculosis was carried unanimously.

Earl SPENCER said he did not like this important recommendation of the Veterinary Committee to pass without some notice from a member of the Council. He had had the honour of being President at one of the General Meetings of the recent Tuberculosis Congress, and he had listened to a paper by that eminent veterinary authority, Professor McFadyean. He (Lord Spencer) could not help thinking that what was said and propounded at the Congress was of profound importance, not only to those interested in the health of the community, but also to the agricultural world. The Report of the Veterinary Committee, as far as he could gather, referred only to one part of this important question. The subject discussed by that distinguished man, Professor Koch, went into two branches. First of all, it dealt with the question of the communication of tuberculosis from human beings to the bovine race, and, secondly, the communication of tuberculosis from the bovine race to human beings. The first proposition was supported by very strong evidence. He was glad, however, that their Veterinary Committee recommended that further experiments should be made.

He felt it his duty, when he was presiding over this meeting of the Congress, to support what had been said on the previous day by his right honourable friend who had been both President of the Local Government Board and President of the Board of Agriculture. Mr. Chaplin had alluded to the great importance of this statement of Professor Koch, and said that if he was able to establish the principles which he was inclined to lay down, it would be an immense relief to the agricultural world. He (Lord Spencer) went further than this, and sincerely hoped that nothing which had been said by Professor Koch would tend to stop the efforts which had been made to prevent the spread of tuberculosis amongst cattle, and to get the proper sanitary regulations applied to dairies in various parts of the country.

He ventured to urge that the Government, or whatever authority took up this question, should deal with it in a judicious manner. A distinguished scientist from Manchester had said that the greater part of the success of Manchester with regard to sanitation depended upon the judicious administration of the law. He thought that sometimes in this country they had been apt to have too stringent measures, without that elasticity which was necessary to properly apply certain principles under different circumstances. He was specially referring to what the Council would remember as having been discussed in that room, viz., the regulations with regard to dairies and cowsheds. Those regulations were at first laid down by the authorities so stringently that exactly the same laws were applied to sheds in towns where the cattle never went out at all, as to the cattle in the country which were only brought in at night, or only at certain periods. He thought the Council would thank the Veterinary Committee for their proposition, and that what they had recommended would lead to further experiments on the subject, and perhaps assist them in arriving at a conclusive decision as to the sources of infection of this terrible disease, and as to the means by which it was spread.

H.R.H. The PRESIDENT said that they were very grateful to Lord Spencer for his speech. He might add that Professor Virchow, who was a most eminent authority, was strongly opposed to Professor Koch's opinion that it was not possible to carry tuberculosis from animals to human beings. It was very necessary that they should not relax their efforts to find out what were really the facts.

Stock Prizes.

Mr. SANDAY (Chairman) reported that the Committee had considered several letters from exhibitors as to the withholding of prizes in certain classes in which, under the regulations, the number of entries were insufficient; but having regard to the fact that the judges' awards did not recommend prizes in these cases, the Committee did not think that any action should be taken in the matter. Various letters had been read from exhibitors who had been fined for the non-exhibition of animals entered for the Cardiff Meeting, and instructions had been given thereon. The Committee gave notice of their intention to move at the November meeting of the Council for a grant of 5,000*l.* for the Carlisle prize-sheet.

Implement.

Mr. SANDAY (in the absence of the Chairman, Mr. Frankish) reported that the first prize of 40*l.* in Class I. for portable oil engines exhibited at the Cardiff Meeting had been awarded to Messrs. Crossley Brothers, Limited, Openshaw, Manchester, for article No. 2,108, and that the second prize of 20*l.* in Class I. had been awarded to Messrs. Ruston, Proctor and Co., of Lincoln, for article No. 2,114. Also that the prize of 15*l.* for a small ice-making plant suitable for a dairy, in Class III., had been awarded to

Messrs. J. and E. Hall, Limited, of Dartford, for article No. 4,070. The Judges of Miscellaneous Implements at Cardiff had recommended that article No. 1,206, exhibited by the Walter A. Wood Mowing and Reaping Machine Company, of 36, Worship Street, London (Bristow's Patent New Turnip and Rape Feed for Drill) should be allowed to be entered as a "New Implement" at the Carlisle Meeting next year, and the Committee recommended that this proposal be approved.

General Carlisle.

Sir **WALTER GILBEY** reported that the Earl of Derby had been elected Chairman of the Committee, and that in Lord Derby's absence he had been elected Chairman of the meeting. The Committee recommended that the Carlisle Meeting should open on Monday, July 7, and close on the following Friday, July 11, 1902, and that the Implement Yard and Dairy only should be opened on the previous Saturday, July 5, at a charge for admission of 1*s*. each person.

A formal motion to this effect was moved by Sir **WALTER GILBEY**, seconded by Mr. **CRUTCHLEY**, and carried unanimously.

Showyard Works.

Sir **JACOB WILSON** (Chairman) reported that the pavilions and nearly all the shedding in the Cardiff showyard had been pulled down, with the exception of those buildings left standing for the use of the Cardiff Horse Show Committee. The first two sales of timber had taken place.

Selection.

Sir **JOHN THOROLD** (Chairman) having read the recommendations of this Committee, moved that the following distinguished scientists be elected as Honorary Members of the Society:—Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, United States Department of Agriculture; and Dr. B. Bang, Professor at the Royal Veterinary College, Copenhagen.

The motion was seconded by the Earl of **DERBY**, and carried unanimously.

Education.

Lord **MORETON** (Chairman) reported that arrangements had been made for the holding of the Examination for the National Diploma in Dairying at Reading from the 23rd to the 26th September next. The Committee recommended that Mr. A. J. Smith be reappointed to represent the Society as a Governor on the Seckford Hospital and Woodbridge Endowed Schools for a further period of five years, and that Mr. Edward Colston, M.P., be reappointed to act as a Governor on Dauntsey's School and Almshouses for a similar term.

Dairy.

Mr. **DUGDALE** (Chairman) reported a letter from the Secretary of the Board of Agriculture Departmental Committee on Butter Regulations, inviting the Society to nominate a witness to give evidence before the Committee on their behalf, had been considered by the Dairy Committee, who recommended that the Departmental Committee be informed that Colonel Curtis-Hayward had been asked to give evidence before the Committee, but not as representing the opinions of the Society. Having given preliminary consideration to the question of prizes for produce at the Carlisle Meeting, the Committee recommended that arrangements be made for the offer of prizes for cider and perry, as at Cardiff.

Miscellaneous.

The date of the December General Meeting of Governors and Members was fixed to be held at the Society's house at 13, Hanover Square, on Thursday, December 12, 1901 (the Thursday of the Smithfield Show week), and the dates of the Council Meetings in 1902 were settled as follows:—February 5, March 5, April 9 (previous week being Easter week), May 7, June 4, July 9 (in the Carlisle showyard), July 30, November 5, and December 10.

Other business having been transacted, the Council adjourned over the autumn recess until Wednesday, November 6, 1901.

WEDNESDAY, NOVEMBER 6, 1901.

H.R.H. PRINCE CHRISTIAN, K.G. (PRESIDENT), IN THE CHAIR.

Present:

Trustees.—Earl Cawdor, Sir Walter Gilbey, Bart, Colonel Sir Nigel Kingscote, K.C.B., Viscount Ridley, Earl Spencer, K.G., Sir John Thorold, Bart.

Vice-Presidents.—Mr. J. H. Arkwright, the Earl of Coventry, the Hon. Cecil T. Parker.

Other Members of Council.—Mr. Alfred Ashworth, Mr. George Blake, Mr. J. Bowen-Jones, Lord Brougham and Vaux, Mr. Victor C. W. Cavendish, M.P., Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Colonel J. F Curtis-Hayward, Mr. J. Marshall Dugdale, Mr. William Frankish, the Marquis of Granby, Mr. R. Neville Grenville, Mr. James Hornsby, Mr. John Howard Howard, Capt. W. S. B. Levett, Mr. Joseph Martin, Mr. T. H. Miller, Mr. P. A. Muntz, M.P., Mr. Albert Pell, Mr W. A. Prout, Mr. J. E. Ransome, Mr. Frederick Reynard, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr. William Scoby, Mr. Henry Smith, Mr. E. W. Stanyforth, Mr. Richard Stratton, Mr. Joseph P. Terry.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton-Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard; Mr. Ernest H. Godfrey, Assistant Editor.

Professor McFadyean; Mr. A. C. Cope; Mr. Harold Swithinbank.

The following members of the Carlisle Local Committee were also present: — Mr. F. P. Dixon, Mr. George Richardson, Mr. Benjamin Scott, and Mr. A. H. Collingwood (Town Clerk).

Apologies for non-attendance were read from the Earl of Derby, K.G., Earl Egerton of Tatton, the Earl of Feversham, Viscount Baring, Lord Arthur Cecil, Lord Middleton, Lord Moreton, Sir Jacob Wilson, Mr. R. C. Assheton, Mr. H. Chandos-Pole-Gell, Mr. Hugh Gorringe, Mr. R. M. Greaves, Mr. Alex. Henderson, M.P., Mr. Henry D. Marshall, Mr. A. E. Pease, M.P., Mr. R. A. Warren, Mr. E. V. V. Wheeler, and Mr. C. W. Wilson.

Election of New Members.

The minutes of the last ordinary meeting of the Council, held on July 31, 1901, having been taken as read and approved, the election of the following fourteen members was proceeded with:—

FORDHAM, A. R...Melbourn Bury, Royston.
FRANK, H.. Rusthall, Wimbledon Common.
GOULDING, E A., M.P...Erchfont, Devizes.
GUBBINS, F. W. B...Park Hall, Salford Priors, Evesham.
HARE, G. M...18, Bride Lane, E.C.
HEYGATE, Capt...Buckland, Leominster.
LEEDS, The Duke of .Hornby Castle, Bedale.
LEPPER, Henry G., M R.C.V.S...Aylesbury.
*MACDONALD, Sir Archibald, Bart...Woolmer, Liphook.
MARSTON, Lt G. M., R.N...Rempstone, Corfe Castle.
NEWTON, Lt.-Col. William Henry..Thoresby, Cheltenham
PERCIVAL. Prof. John..South Eastern Agricultural College, Wye.
SCHIFF, Sydney Newbold, Chester.
SWINDELLS, G. C...Monks Horton Park, Hythe.

* Re-instated under Bye-law 12.

The Reports of the various Standing Committees were then presented and adopted as below:—

Finance.

Viscount RIDLEY reported that the accounts for the three months ended October 31, 1901, as certified by the Society's Accountants, showed total receipts amounting to 11,119*l.* 15*s.* and expenditure amounting to 12,367*l* 19*s.* 9*d.* Accounts amounting in all to 2,782*l.* 11*s.* 11*d* had been passed, and were recommended for payment. The quarterly statement of subscriptions, arrears, and property to September 30, 1901, had been laid upon the table. The Secretary had submitted a provisional balance-sheet for the Cardiff Show, and had reported that there were still some matters outstanding as to which it had not been possible to obtain a final settlement. The surplus of receipts over expenditure was, however, about 2,000*l.* The Committee had ordered the balance-sheet, when completed, to be referred to the Auditors for examination.

House.

The SECRETARY said that although there had been no formal meeting of the House Committee this month, there was a matter connected with the Society's house to which attention should be drawn. One of the decorations of the meeting-room of the old Board of Agriculture at 32, Sackville Street was a marble bust of that distinguished agriculturist, Francis Duke of Bedford, standing on a fluted mahogany pedestal, as would be seen in Rowlandson's engraving of the "Society of Agriculture," published in 1809 in Ackermann's "Microcosm of London," and reproduced in the Society's Journal for 1898, page 21. This bust was by the famous sculptor, J. Nollekens, R.A., and had been presented to the old Board of Agriculture by the sixth Duke of Bedford, in memory of his brother, an active member of the Board, who had died on March 6, 1802. On the dissolution of the Board in 1822, the bust was, with the pedestal, returned to the Duke of Bedford, and had since remained at Woburn. The original bust had been mounted on another (marble) pedestal in the Woburn Sculpture Gallery, and the present Duke of Bedford had very generously presented the mahogany pedestal, prepared in 1803 under the direction of the old Board of Agriculture, to this Society, which now fulfilled the same functions as that Board did a century ago, and had also presented to the Society a plaster cast of the original bust of Duke Francis (see p. 367).

At the request of the Council, H.R.H. the PRESIDENT undertook to communicate to the Duke of Bedford by a personal letter of thanks the Council's cordial appreciation of this very acceptable gift and adornment to their Council Chamber.

Journal.

Sir JOHN THOROLD (Chairman) reported that the contents of the next volume of the Journal had been provisionally settled, and directions had been given on several suggestions for articles, and other details connected with the Journal. The Committee recommended that the volume for the current year, 1901, be called Volume 62 of the entire series, and be issued bound in green cloth, similar to the present binding.

Chemical and Woburn.

Mr. BOWEN-JONES (Chairman) stated that various reports by the Consulting Chemist had been passed for publication in the Journal. The Committee reported the progress of various alterations and repairs undertaken at the Woburn Experimental Farm. The proposed feeding experiments at Woburn had been discussed in the light of the suggestions which had been made during the recess by different members of the Committee. As regards the bullock-feeding experiment, it was considered that as the beasts purchased were too forward in condition, the scheme of high feeding against low feeding, as previously sanctioned, was not suitable, and it had been decided to substitute the following:—Lot 1: Eight bullocks, to receive linseed cake, decorticated cotton cake, and maize meal. Lot 2: Eight bullocks, to receive beans, oats, and wheat. The Committee gave notice that at the December meeting of the Council they would move for the renewal of their annual grant for 1902 of 200*l.* for the Pot Culture Station.

Feeding Experiments, 1901–1902.

Mr. BOWEN-JONES, in presenting this report, stated that the object of the experiments with bullocks was to distinguish between imported foodstuffs and home-grown corn as feeding materials for cattle. The principal object of the sheep experiments was to decide whether a full supply of roots was more suitable and desirable in feeding sheep than a limited amount with a larger quantity of cake and corn.

Botanical and Zoological.

Mr. ASHWORTH stated that reports by the Consulting Botanist and Zoologist, and a report by the

Consulting Chemist on weed experiments had been considered and passed for publication in the Journal. It had been arranged that the weed experiments should be continued.

Veterinary.

The Hon. CECIL PARKER (Chairman) reported that a meeting had been held of the Sub-Committee appointed to supervise the Society's experiments on the possibility of infecting bovine animals with tuberculous material from the human subject, and that the experiments had been in progress for over three months. An article by Professor McFadyean on Epizootic or Contagious Abortion had been referred to the Journal Committee for publication in the forthcoming volume of the Journal (see pp. 96-112).

Professor McFadyean had presented the following Report on the diseases of animals :—

ANTHRAX.—During the past three months (thirteen weeks) 120 outbreaks, with 164 animals attacked, have been reported, as against 108 outbreaks and 206 animals attacked during the corresponding period of last year.

GLANDERS.—During the same period the outbreaks have numbered 387, and the animals attacked 679. The corresponding figures for last year were 314 and 481 respectively.

SWINE FEVER.—The outbreaks for the three months number 458, as against 289 for the same quarter of last year. There has been a notable decline in the reported cases of the disease since the early part of the year, the average weekly outbreaks for October having been twenty-six, whereas 152 outbreaks were reported in one week in April.

RABIES AND FOOT-AND-MOUTH DISEASE.—No case of either of these diseases has been reported during the past three months.

MISCELLANEOUS.—During the past quarter seventy-four morbid specimens were forwarded to the Research Laboratory at the Royal Veterinary College for examination. A number of animals have been purchased for the purpose of the investigation regarding the relationship between human and bovine tuberculosis, and some experiments bearing on the question are now in progress.

The Committee gave notice that at the next meeting of Council they would move for the renewal of their annual grant of 600*l.*, of which 500*l.* would be allocated to the Royal Veterinary College and 100*l.* reserved for general purposes.

Stock Prizes.

Mr. SANDAY (Chairman) reported that of the animals to which prizes had been awarded in the breeding sow pig classes at the Cardiff Meeting, the following had failed to comply with the regulations as to farrowing :—

CLASS 211, No. 1476.—Mr. Sanders Spencer's Middle White Sow, 'Holywell Middlesboro' 2nd," awarded the Second Prize of 5*l.*

CLASS 219, No. 1528.—Mr. R. W. Hudson's Berkshire Sow, "Danesfield Huntress," awarded the First Prize of 10*l.*

In consequence of these disqualifications the Committee recommended that the prizes in these classes be awarded as follows :—

CLASS 211.—MIDDLE WHITE BREEDING SOWS.

No. 1477.—Second Prize. 5*l.*, to Mr. Sanders Spencer for "Holywell Rosy O'Grady." [Originally Third Prize.]

No. 1475.—Third Prize, 3*l.*, to Mr. John Jefferson for his sow by "Rufus 9th." [Originally Reserve Number.]

CLASS 219.—BERKSHIRE BREEDING SOWS.

No. 1519.—First Prize, 10*l.*, to Mr. Edward Burbidge for his sow by "Pressmoor Foundation 2nd." [Originally Second Prize.]

No. 1531.—Second Prize, 5*l.*, to Mr. John Jefferson for "Peel Agnes." [Originally Third Prize.]

The Committee had prepared a prize-sheet for the Carlisle Meeting, and instructions had been given for copies to be circulated among Members of the Council before the December meeting, when a formal motion would be moved for its adoption.

They also recommended the acceptance with thanks of the following offers of champion prizes :—

HUNTERS' IMPROVEMENT SOCIETY.—Gold medal, value 10*l.* 10*s.*, for the best hunter filly.

SHIRE HORSE SOCIETY.—Two champion gold medals, for the best Shire stallion and the best Shire mare or filly.

RED POLLED SOCIETY.—Two champion prizes of 10*l.* each, for the best Red Polled bull and the best Red Polled cow or heifer.

POLLED CATTLE SOCIETY.—Gold medal, for the best breeding animal in the Aberdeen-Angus classes.

SOUTHDOWN SHEEP SOCIETY.—Champion prize of 10*l.* 10*s.*, for the best two-shear or shearling Southdown ram.

NATIONAL PIG BREEDERS' ASSOCIATION.—Three champion gold medals, for the best boar or sow of the Large White, Middle White, and Tamworth breeds.

Prize-sheet for Carlisle Meeting, 1902.

Mr. **SANDAY**, in moving, pursuant to notice, "That the sum of 5,000*l.* be placed at the disposal of the Committee for providing prizes for live stock, poultry, produce, &c., at the Carlisle Meeting of 1902," said that, in reference to this sum, the amount of prizes as set out in the draft prize-sheet that had been submitted amounted, in round figures, to 4,600*l.*

Viscount **RIDLEY** remarked that with regard to the sum of 5,000*l.* mentioned by Mr. Sanday, he understood that the Committee had settled prizes to the value of 4,600*l.*, and he thought they ought to be content with that. He believed that at a former meeting the sum of 4,000*l.* had been suggested, with which amount he hoped the Committee would have been satisfied. He was quite of opinion, with the rest of the Council, that it was undesirable that the Society should cut down the classes below what they ought to be, but still he considered that 4,000*l.*, added to the amount of the local prizes, was sufficient. He did not wish to oppose the motion made by Mr. Sanday, but still he ventured to hope that the Committee would not think it necessary to spend so much as 5,000*l.* in prizes.

Mr. **SANDAY** replied that it had certainly been suggested that the prizes for 1902 should be limited to 4,000*l.*, and the Sub-Committee had prepared a prize-sheet with this object in view, but had been overruled. Although he was now asking for 5,000*l.*, that sum was only the maximum; and it was not suggested that the prizes should be increased beyond the 4,600*l.*

Sir **NIGEL KINGSCOTE** observed that, as Chairman of the Society's Finance Committee, he desired to endorse the remarks which had been made by Lord Ridley on this subject. He had certainly hoped that the sum of 4,000*l.* would have been enough for prizes. He trusted that the sum of 4,600*l.* would not be exceeded, and therefore the sum of 5,000*l.* would not be required, for he felt it necessary once more to emphasise the importance of the Committees responsible for the expenditure on the Shows having due regard to the state of the Society's finances.

Mr **SANDAY** then formally moved his motion, which was seconded by Mr. **FRANKISH**, and carried; and the Report of the Stock Prizes Committee was also adopted.

Implement.

Mr. **FRANKISH** (Chairman) reported that the Committee had had under consideration various suggestions for trials of implements at the Carlisle Meeting, but had decided that no competitive trials of implements should be undertaken in connection with the meeting of 1902. They had approved the Implement Regulations for the Carlisle Meeting, and had also considered the nomination of judges for the miscellaneous implements to be entered for silver medals.

General Carlisle.

Sir **WALTER GILBEY** reported that the schedule of local prizes offered by the Carlisle Local Committee had been considered, and, subject to various modifications proposed by the Stock Prizes Committee, had been accepted for inclusion in the prize-sheet to be finally considered at the December Council Meeting. The Local Committee were in communication with the various railway companies respecting the arrangements for bringing exhibits and visitors to the Show.

Showyard Works.

Mr. **CRUTCHLEY**, in the absence through indisposition of the Chairman (Sir Jacob Wilson), stated that the results of the first three timber sales at Cardiff had proved so unsatisfactory that it was decided to abandon the sales and transfer the timber remaining unsold to Carlisle, where it was now stored, together with the permanent buildings &c. Instructions had been given for the issue of forms of tender for the supply of further timber required for the construction of the Showyard at Carlisle.

Selection.

Sir **JOHN THOROLD** (Chairman) announced that letters had been received from Dr. Salmon and Dr. Bang expressing thanks for their election as honorary members of the Society. The Committee reported with regret the death of Professor Maercker, of Halle, an honorary member of the Society.

Education.

Mr. DUGDALE reported that the examination for the National Diploma in Dairying had been held at Reading from September 23 to 27, and at Kilmarnock from September 30 to October 4 last. The examination in general dairying and cheese-making had been conducted by the same examiners at both centres (Mr. J. R. Campbell and Mr Wm. McFadyean), with different examination papers. The examination in chemistry and bacteriology at Reading had been carried out by Dr. J. A. Voelcker, Consulting Chemist to the Royal Agricultural Society, and at Kilmarnock by Dr. A. P. Aitken, Consulting Chemist to the Highland and Agricultural Society. Eighteen candidates had been examined at Reading, of whom six, having satisfied the examiners, had been awarded the diploma Of the eleven candidates examined at Kilmarnock, two candidates had also been successful in gaining the diploma.

The Committee recommended that Mr. William Frankish be re-appointed the Society's representative Governor on Cowley's Charity, Donington, and that Mr. J. Marshall Dugdale be appointed the Society's representative Governor on the Harper Adams Foundation, Newport, Salop, in succession to Mr. Alfred Darby.

Dairy.

Mr. DUGDALE (Chairman) reported that the Committee had drawn up a schedule of prizes for butter on the basis of last year's prize-sheet, and had recommended the addition of classes for butter and cheese in tins or pots prepared for export, and made in the United Kingdom.

Special Show Committee.

The Hon. CECIL PARKER (Chairman), in presenting a final report from the Special Show Committee, said that the duty he had now to perform was a simple one, viz. to report formally to the Council the steps that had been taken during the recess to carry into effect the various instructions with regard to the new permanent site estate which were given by the Council at their last meeting on July 31. The terms of the agreement for the purchase of the 102 acres of land had been finally settled, and the agreement now only awaited the formal approval of the Council and the affixing of the Society's seal. The total amount of promises received to the special fund for the acquisition and equipment of the site was 26,239*l.* 10*s.* 6*d*,, and the actual amount received to date was 12,468*l.* 12*s*., of which 10,000*l.* had already been paid to the vendor in part payment for the property. The Committee had given instructions as to the collection of the balance of the sums promised. Some preliminary works in preparation of the ground for the purposes of the Showyard had already been put in hand; and further questions as to the fencing, draining, and levelling of the site had been remitted for settlement by the Site Committee, for the creation of which notice had been given under Bye-law 38. Mr. Parker concluded by moving the following resolutions:—

(*a*) That the seal of the Society be affixed to the Memorandum of Agreement, dated September 30, 1901, for the purchase of 102 acres of land at Twyford, as defined in the plan attached to such agreement, for the price of 25,800*l.*

(*b*) That the Special Show Committee appointed on July 26, 1899, be now dissolved, and that all matters connected with the administration of the Society's Permanent Show Estate be remitted to a new Standing Committee of the Council, to be called the Site Committee, such Committee to consist of Sir Walter Gilbey, Sir Nigel Kingscote, Mr. Crutchley, and Mr. Sanday.

These resolutions were seconded by Mr. CRUTCHLEY, and carried unanimously.

Date of next Meeting.

Other business having been transacted, the Council adjourned until Wednesday, December 11, 1901, at 12 noon.

WEDNESDAY, DECEMBER 11, 1901.

H.R.H. PRINCE CHRISTIAN, K.G. (PRESIDENT), IN THE CHAIR.

Present:

Trustees. — Earl Egerton of Tatton, Sir Walter Gilbey, Bart., Colonel Sir Nigel Kingscote, K.C.B., Sir John Thorold, Bart.

Vice-Presidents. — The Earl of Coventry, the Earl of Feversham, the Hon. Cecil T. Parker.

Other Members of Council.—Mr. R. C. Assheton, Viscount Baring, Mr. J. Bowen-Jones, Lord Brougham and Vaux, Mr. Victor C. W. Cavendish, M.P., Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Lieut.-Colonel J. F. Curtis-Hayward, Mr. S. P. Foster, Mr. William Frankish, Mr. R. M. Greaves, Mr. R. Neville Grenville, Mr. John Howard Howard, the Earl of Jersey, G.C.B., Capt. W. S. B. Levett, Mr. H. D. Marshall, Mr. Joseph Martin, Lord Middleton, Mr. A. E. Pease, M.P., Mr. Albert Pell, Mr. W. A. Prout, Mr. J. E. Ransome, Mr. C. C. Rogers, Mr. Howard P. Ryland, Mr. G. H. Sanday, Mr. Henry Smith, Mr. E. W. Stanyforth, Mr. Richard Stratton, Mr. Martin J. Sutton, Mr. Garrett Taylor, Mr. E. V. V. Wheeler, Mr. C. W. Wilson.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. J. E. Compton - Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard; Mr. Ernest H. Godfrey, Assistant Editor.

Professor McFadyean.

The following members of the Carlisle Local Committee were also present:—Mr. Joseph Harris, Mr. H. C. Howard, and Mr. A. H. Collingwood (Town Clerk).

Apologies for non-attendance were read from Earl Spencer, K.G., Earl Cawdor, Lord Moreton, Sir Jacob Wilson, Mr. J. H. Arkwright, Mr. Alfred Ashworth, Mr. George Blake, Mr. Alfred Darby, Mr. J. Marshall Dugdale, Mr. James Hornsby, Mr. T. H. Miller, Mr. P. A. Muntz, M.P., Mr. F. Reynard, Mr. W. Scoby, Mr. R. A. Warren, and Mr. Charles Whitehead.

Election of New Members.

The minutes of the last ordinary meeting of the Council, held on November 6, 1901, having been taken as read and approved, the election of the following fourteen members was proceeded with:—

ASHTON, Miss Eveline...Little Onn Hall. Stafford.
ELVIDGE, H...Lissett, Driffield.
GARDNER, Ernest, M.P Spencers, Maidenhead.
IVESON, E...Charters, Ascot.
JAMES, M. E...Greville Hall, Evesham.
*MACDONALD, W...Lovedale, Cape Colony.
MATTHEWS, A. H. H...Broad Sanctuary Chambers, S.W.
OWEN, W...Watertown, South Molton.
SEDGWICK, T. F...Office of Experiment Stations, U.S. Department of Agriculture, Honolulu, Hawaii.
SHELLEY, Captain J. C. E...Avington, Alresford.
SHEPPERSON, E. W...Keyworth House, Benwick, March, Cambs.
TATHAM, H. T.. Loseberry, Claygate.
THORNELY, S...Brookfield, Broomhall, Worcester.
WELCH, Bryan...Stafford House, Leighton Buzzard.

* Re-instated under Bye-law 12.

The Reports of the various Standing Committees were then presented and adopted as below:—

Finance.

SIR NIGEL KINGSCOTE (Chairman) reported that the accounts for the month of November, 1901, as certified by the Society's Accountants, showed total receipts amounting to 1,122*l.* 5*s.* 10*d.*, and expenditure to 2,788*l.* 16*s.* 1*d.* Accounts amounting in all to 3,247*l.* 0*s.* 1*d.* had been passed, and were recommended for payment. The Committee recommended that Mr. F. S. W. Cornwallis and Mr. G. H. Sanday be appointed Stewards of Finance for the Carlisle Meeting. The final financial statement for the Cardiff Meeting showed that the excess of receipts over expenditure was 1,998*l.* 4*s.* 4*d.* The Committee had met fifteen times during the year and made ten reports to the Council.

House.

Sir **Nigel Kingscote** (Chairman) reported that various accounts had been passed for payment. The Committee had met five times and made five reports during the year.

Journal.

Sir **John Thorold** (Chairman) reported that accounts for printing, &c., had been passed for payment. The Committee had discussed and finally settled the contents for the forthcoming volume of the Journal (No. 62 of the entire series), and the arrangements for its publication and issue to members. The Committee had met eight times and made eight reports during the year.

Chemical and Woburn.

Mr. **Bowen-Jones** (Chairman) presented the Committee's recommendation that the following report by the Consulting Chemist be published with the Proceedings:—

REPORT OF CONSULTING CHEMIST.

I.—Impure Linseed Cake.

A member of the Society, resident in Cambridgeshire, sent for analysis, on July 26, a sample offered to him as "linseed cake." My report on this was: "This is an adulterated cake, containing earthnut, rape, chenopodium, spurry, polygonum, and other weed seeds."

The member had fortunately sent the sample for analysis before actually making his purchase.

II.—Necessity of Obtaining a Definite Guarantee at Time of Sale.

A member of the Society, resident in Bedfordshire, sent for analysis, on September 2, a sample of what had been sold to him as "good English-made linseed cake." Three tons of this were purchased at 7*l.* 17*s.* 6*d.* per ton delivered. My report was:—

September 9, 1901.

Moisture	10·00
Oil	6·30
*Albuminous compounds (flesh-forming matters)	25·12
Mucilage, sugar, and digestible fibre	42·10
Woody fibre (cellulose)	8·13
†Mineral matter (ash)	8·53
	100·00
*Containing nitrogen	4·02
†Including sand	2·95

A much-adulterated cake, containing niger and other foreign seeds, and with excess of sand and starchy impurities. Its quality is very low.

On the invoice being received it was found to describe the cake as "3 tons oilcake," and subsequent inquiry showed that there had been no definite guarantee given.

III.—Ground Cotton-seed Meal.

A member of the Society sent in October, for analysis, a sample of a purchase of "ground cotton-seed meal," which he had made on the strength of a circular received from the vendors and of a written guarantee. The circular described the parcel offered as one of "pure American ground cotton-seed meal," at 5*l.* 10*s.* per ton, and gave a recent analysis of this meal, showing oil 7·46 per cent. The written guarantee was to the effect that the meal was the product of pure cotton-seed only, and was entirely free from wool.

After examining the sample sent me, I wrote to the member, pointing out to him that, in my opinion, the meal was not "ground cotton-seed meal," but was ground cotton-seed *cake*, the largest proportion of the oil of the original cotton-seed having been extracted in the process of pressing the seed into cake. A true description of the meal would have been "cotton-seed cake meal," which material might have given an analysis like that quoted in the circular, whereas, if it had been strictly "ground cotton-seed meal," it would have consisted of the whole cotton-seed merely ground into meal, without expression of the oil, and, as such, would have yielded about 23 per cent. of oil.

The vendors, in correspondence, said that by a printer's error, the word "cake" had been left out, but maintained that, as they had given the analysis, they did not mislead the purchaser. In the end they offered to take the meal back, and this offer was accepted.

The case illustrates the importance of purchasers exercising particular care in having the feeding stuffs they buy described by their proper terms, and seeing that misleading descriptions are not applied to them.

(Signed) J. AUGUSTUS VOELCKER.

December 10, 1901.

The Committee desired to draw the special attention of purchasers of common or undecorticated cotton cake to the increasing practice of putting borax or other chemicals into cotton cake in order to maintain the bright colour of newly crushed cake, which in the case of cakes not thus treated passes off on keeping. Cakes thus treated should be avoided by purchasers.

Arrangements had been made for the valuation of the Woburn corn crops of 1901; and consideration had been given to details connected with the Woburn Field and Feeding Experiments. The Committee moved for the renewal of their grant of 200*l.* for the purposes of the Pot Culture Experiments in 1902, and they had approved of proposals for the conduct of these experiments. The Committee had met eight times and made eight reports during the year.

On the motion of Mr. **Bowen-Jones**, seconded by the Earl of **Coventry**, a grant of 200*l.* was formally made to the Committee for the purposes of the Pot Culture Experiments in the year 1902.

Botanical and Zoological.

Mr. **Wheeler** (Chairman) reported that attention had been given to various details in connection with the work of the Botanical and Zoological Departments. The Committee had met eight times and made eight reports during the year.

Veterinary.

The Hon. **Cecil Parker** (Chairman) reported the recommendation of the Committee that horse-shoeing competitions be held in two classes at the Carlisle Meeting of 1902, viz :—Class I. for hunters, and Class II. for cart horses. They had also approved of the regulations for issue with the Stock Prize Sheet.

Professor McFadyean had presented the following report :—

> **Anthrax.**—During the last four weeks for which returns have been published, 59 outbreaks, with 76 animals attacked, have been reported. The corresponding figures for last year were 48 and 63 respectively.
>
> **Glanders.**—During the same period 94 outbreaks, with 159 animals attacked, have been notified, as against 80 outbreaks and 155 animals attacked in the corresponding four weeks of last year.
>
> **Swine Fever.**—The outbreaks for the past four weeks number 115, which is one less than for the corresponding period of 1900.
>
> **Foot-and-Mouth Disease and Rabies.**—The country now appears to be free from both these diseases. The last reported outbreak of foot-and-mouth disease occurred on April 12, 1901, and the last case of rabies was confirmed on April 22, 1901.
>
> **Miscellaneous.**—The number of morbid specimens forwarded to the Research Laboratory at the Royal Veterinary College for examination during the month of November was 44, and during the same period one outbreak of abortion in cows was locally investigated. The organs of two foxes sent to the Chemical Laboratory for analysis were found to contain strychnia.

The Committee moved for the renewal of their annual grant of 600*l.* for the year 1902, of which 500*l.* would be allocated to the Royal Veterinary College. They had met eight times and made eight reports during the year.

Foot-and-Mouth Disease.

Mr. **Stratton** said that as it was now eight months since the last case of foot-and-mouth disease had been reported, he considered the Board of Agriculture need have no hesitation in officially declaring the country to be free from that disease. This was a matter to which he thought the Royal Agricultural Society could not be indifferent, in view of the important interests involved to stock-breeders and farmers generally: and he wished therefore to move a resolution expressing the view of the Council that it was highly important that the country should be declared free from foot-and-mouth disease.

The Earl of **Coventry** seconded the proposal.

Mr. **Crutchley** said that he understood that although the country was actually free from foot-and-mouth disease, there were some administrative difficulties about its being officially declared so.

Mr. **Bowen-Jones** said it made a great difference to breeders of pedigree stock, because the Argentine Republic was closed until it had been officially declared that foot-and-mouth disease did not exist in this country. Until that declaration was made, breeders were prejudiced very considerably. The National Sheep Breeders' Association had asked that this should be done, but up to the present the Board of Agriculture would not say that the disease had ceased to exist, although it had not appeared since last April.

The discussion was continued by Sir **Nigel Kingscote**, Sir **John Thorold**, the Earl of **Feversham**, Mr. **Pell**, and others, and eventually the following resolution was, on the motion of Mr. **Stratton**, seconded by the Earl of **Coventry**, carried unanimously, and ordered to be communicated to the President of the Board of Agriculture :—

> That this Council desire to draw the attention of the Board of Agriculture to the fact that no case of foot-and-mouth disease has

been reported in this country since April 12 last, and to express the hope that under these circumstances His Majesty's Government may be able to see their way to officially declare the country free from the disease.

Stock Prizes.

Mr. SANDAY (Chairman) reported that the Committee recommended the acceptance, with thanks, of the following offers of prizes at the Carlisle Meeting:—

HACKNEY HORSE SOCIETY: Two gold medals for the best stallion and mare or filly in the Hackney breeding classes.

POLO PONY SOCIETY: Two gold medals for the best Polo pony stallion and mare; and silver medals for the best animals exhibited in the classes for Mountain and Moorland, and Fell ponies.

SHIRE HORSE SOCIETY: Two prizes of 5*l*. each to the breeders of the champion Shire stallion and Shire mare, on condition that the breeder is a member of the Shire Horse Society, and that the dams are mares registered in the Shire Horse Stud Book.

LINCOLNSHIRE RED SHORTHORN ASSOCIATION: Similar classes and prizes to those offered at the Cardiff Meeting.

GALLOWAY CATTLE SOCIETY: Two challenge cups for the best Galloway bull and cow or heifer.

OXFORD DOWN SHEEP BREEDERS' ASSOCIATION: Two third prizes of 3*l*. each in the classes for lambs.

SHROPSHIRE SHEEP BREEDERS' ASSOCIATION: Three prizes of 15*l*., 10*l*., and 5*l*., for five Shropshire shearling rams.

LINCOLN LONGWOOL SHEEP BREEDERS' ASSOCIATION: Three prizes of 15*l*., 10*l*., and 5*l*., for five Lincoln shearling rams.

SUFFOLK SHEEP SOCIETY: Gold medal for the best two-shear or shearling ram in the Suffolk classes.

BRITISH BERKSHIRE SOCIETY: Prize of 5*l*. for the best Berkshire boar or sow.

NATIONAL PIG BREEDERS' ASSOCIATION: Four gold medals for the best Large White, Middle White, Small White, and Tamworth boar or sow.

The Committee had considered a letter from the English Aberdeen-Angus Cattle Association, asking that the age of animals of this breed should be reckoned as from December 1st, instead of January 1st. The question had previously been considered by the Committee on several occasions, and they regretted that they were unable to recommend any alteration in the calculation of the ages in favour of this particular breed.

[The total value of the prizes, exclusive of champion prizes and medals offered by the various breed societies is 6,069*l*. 5*s*., to which the Carlisle Local Committee will contribute the amount of 1,250*l*., and various breed societies 313*l*. The distribution of prizes is as follows (see pp. clxxviii *et seq.*):—

	£	s.	d.
Horses	1,868	0	0
Cattle	1,805	0	0
Sheep	1,287	0	0
Pigs	396	0	0
Poultry	243	15	0
Produce	201	0	0
Hives and honey . .	38	10	0
Horse-shoeing . . .	32	0	0
Butter-making . .	38	0	0
Horse-jumping . .	160	0	0
	£6,069	5	0]

Sir NIGEL KINGSCOTE said he noticed in the draft prize-sheet submitted to the Council for adoption a number of new departures, and amongst them the offer of prizes for White Shorthorn bulls. He would ask whether these bulls were to be pedigree bulls or common bulls, and also if any bulls exhibited in other classes at the show could compete for these prizes. He did not know whether the object of offering such prizes as these was to introduce yet another breed of Shorthorns. For his part he was sorry that they had accepted prizes for the Red Lincolnshire Shorthorns. Was it now intended to create another class for White Cumberland Shorthorns? He objected also to the prizes proposed to be offered for cross-bred Polled bullocks and heifers. He very much regretted that their friend, Sir Jacob Wilson—who, he was glad to learn, was in a rather better state of health than he had been lately—was not able to attend that day. Had he been present, he would certainly have raised his voice on these subjects. It was always understood that the Society offered prizes for breeding animals. It might be said, perhaps, that they offered prizes for hunter geldings, but that was a very different thing. Were these bullocks to be fat bullocks, and were they going to have a fat stock show in the middle of June or July? He quite appreciated the generosity of the Carlisle Local Committee, but, at the same time, he must enter his humble and respectful protest against their generosity being applied in the way proposed.

Mr. SANDAY said that it had already been explained to the representatives of the Carlisle Local Committee that it was contrary to precedent for these prizes to be offered, but that as next year's show at Carlisle was their last migratory show, and as the Local Committee were very strongly in favour of the prizes in question, feeling that the popularity of the show largely depended upon them, the Stock Prizes Committee had recommended that under the circumstances they should be accepted. With regard to Sir Nigel Kingscote's observations as to the classes for White Shorthorn bulls, they were to be either pedigree or non-pedigree animals, and the rules that applied to other breeds would also apply to these classes, viz., that no animal would be eligible for entry in more than one class.

The report of the Stock Prizes Committee was then adopted.

On the motion of Sir WALTER GILBEY, authority was given to Mr. Sanday, as Chairman of the Stock Prizes Committee, to accept any further offers of prizes from breed societies that might be received before the issue of the prize-sheet, provided that they were in conformity with the regulations.

Implement.

Mr. FRANKISH (Chairman) reported that the Committee had considered the plan of the Implement Yard at Carlisle, and had submitted certain modifications for the consideration of the Showyard Works Committee. The Committee had met eight times and made eight reports during the year.

General Carlisle.

Sir WALTER GILBEY reported that the Committee had considered and approved the revised Schedule of Prizes submitted by the Carlisle Local Committee. The hour of opening the showyard at Carlisle had been fixed for 8 30 A.M. on each day of the Meeting. The Committee recommended the appointment of the following local agents for the Carlisle Meeting:—For the letting of lodgings, Messrs J M. Richardson and Son, of Carlisle; for the sale of season tickets, Messrs. Thurnam and Sons, of English Street, Carlisle; for the sale of dairy produce, Messrs. J. and W. Maxwell and Sons, of Carlisle.

Showyard Works.

Mr. CRUTCHLEY, in the absence of Sir Jacob Wilson, through continued ill-health, reported that arrangements had been made for the supply of refreshments at the Carlisle Meeting, and that the tender of Messrs. R. Wade, Sons & Co., of Hull, for the supply of the timber required for the Carlisle Meeting had been accepted. The Committee had met eight times and made eight reports during the year.

Selection.

Sir JOHN THOROLD (Chairman), having read the recommendations of this Committee, formally moved, and Mr. CRUTCHLEY seconded, the appointment of Mr. R. Neville Grenville as a Steward of Implements and of Mr. E. W Stanyforth and Viscount Baring as Stewards of Stock, for the Carlisle Meeting. During the year they had met eight times and made eight reports. They recommended that in accordance with the Standing Order passed by the Council on December 11, 1895, the Committee of Selection be constituted for the ensuing year of the President, the Chairman of each of the Standing Committees, the Earl of Derby, K.G., Mr. H. D. Marshall, and Mr. A. J. Smith, and the following three new members, Earl Cawdor, Mr. R. M. Greaves, and Mr. F. Reynard, in the room of Messrs. Crutchley, Ransome, and Wheeler, who retired by rotation.

Education.

Sir NIGEL KINGSCOTE reported that the Regulations and Syllabus for the Examinations of 1902, for the National Diploma in Agriculture and the National Diploma in Dairying would be finally settled by the National Agricultural Examination Board at a meeting to be held that week. The representatives of the Royal Agricultural Society on the Board for the year 1902 would be: The President, Lord Moreton, the Hon. Cecil Parker, Mr. Bowen-Jones, Mr. Dugdale, Mr. Sutton, and Sir Ernest Clarke. The Education Committee had met six times and made six reports during the year, and they moved for the renewal of their grant of 400*l.* for the year 1902.

Dairy.

Colonel **Curtis-Hayward** reported that the Committee had finally settled the produce portion of the Carlisle prize-sheet, and the regulations for the butter-making competitions proposed by the Local Committee. The prizes for produce would include classes for tins or jars of butter and cheese suitable for export The Committee had met eight times and made eight reports during the year.

Site Committee.

Mr. **Crutchley** (Chairman) reported that since the constitution of the Site Committee at the Council meeting of November 6, two meetings had been held, at which they had given instructions as to the levelling and fencing of the new showyard, and as to various other matters connected with the site. A total of 27,853*l.* 3*s.* 6*d.* has been promised (by 376 subscribers) to the Permanent Show Fund, of which 20,683*l.* 5*s.* 6*d.* had already been received. The Committee recommended that the payments necessary to be made for the expenses of preparing the ground as a showyard be made out of the funds at the credit of the Society's No. 3 Account (representing the Permanent Show Fund), the cheques drawn on such account to be signed by two members of the Committee (one of whom to be a Trustee of the Society) and by the Secretary. The Committee had remitted to the Assistant Director the detailed superintendence of correspondence and other matters connected with the Permanent Site, it being understood that on any questions of general policy the Secretary was to be consulted.

Sir **Nigel Kingscote** pointed out that although the amount promised was sufficient for the purchase of the land, it did not make provision for drainage, gas and water piping, fencing and roads, or for the requisite buildings, such as permanent stabling and the more substantial structures of a showyard. The Committee would, therefore, be glad to receive further contributions towards the Fund.

Standing Committees for 1902.

The following Standing Committees were appointed for 1902:—Finance, House, Journal, Chemical and Woburn, Botanical and Zoological, Veterinary, Stock Prizes, Implement, Showyard Works, Selection, Education, Dairy, Site.

The present members of the various Standing Committees were (with some exceptions) re-appointed to those Committees. Mr Crutchley was added to the House Committee; Mr. Neville Grenville to the Journal and Botanical Committees; Mr. Prout to the Chemical Committee; Mr. Scoby to the Stock Prizes Committee; Lieut.-Col. Curtis-Hayward to the Education Committee; and Mr. Rogers to the Dairy Committee.

Committee for selection of Judges.

On the motion of Mr **Sanday**, seconded by Mr. **Crutchley**, a Committee was appointed to recommend Judges of Stock, Poultry and Produce at the Carlisle Meeting: such Committee to consist of the members of the Stock Prizes Committee, and the Stewards in the several departments, and to sit for the first time in February, 1902.

Report to General Meeting.

The Report of the Council to the General Meeting of Governors and Members, to be held on the following day (Thursday), was considered and finally settled (see p. 208).

Miscellaneous.

Other business having been transacted, the Council adjourned over the Christmas recess until Wednesday, February 5, 1902.

Proceedings at Half-Yearly General Meeting of Governors and Members,

HELD AT THE SOCIETY'S HOUSE, 13, HANOVER SQUARE, LONDON, W.

THURSDAY, DECEMBER 12, 1901.

H.R.H. PRINCE CHRISTIAN, K.G. (PRESIDENT), IN THE CHAIR.

Present:

Trustees.—Earl Egerton of Tatton, Sir John H. Thorold, Bart., Colonel Sir Nigel Kingscote, K.C.B.

Vice-Presidents.—The Earl of Feversham, the Hon. Cecil T. Parker.

Other Members of Council.—Mr. R. C. Assheton, Viscount Baring, Mr. J. Bowen-Jones, Mr. Victor C. W. Cavendish, M.P., Mr. Percy Crutchley, Lieut.-Col. J. F. Curtis-Hayward, Mr. J. Marshall Dugdale, Mr. William Frankish, Lord Middleton, Mr. Alfred E. Pease, M.P., Mr. Albert Pell, Mr. C. C. Rogers, and Mr. Howard P. Ryland.

Governors.—The Right Hon. R. W. Hanbury, M.P., Mr. W. F. Holt-Beever.

Honorary Members.—Mr. A. C. Cope, Professor J. McFadyean.

Members.—Messrs. Arthur W. Arkwright, Thomas Carrick, H. S. Daine, Henry Dudding, T. H. Elliott, C.B., the Rev. J. Gillespie, LL.D., Messrs. George Graham, Robert G. Hanson, James T. Hobbs, Surgeon Lieut.-Col. J Ince, M.D., Messrs. C. Middleton, J. E. Moore-Gwyn, R Jasper More, M.P., Claude M. Pilkington, T. H. Ryland, Leonard Sutton, Arthur H. Sykes, J. Herbert Taylor, Howard Thomas, Martin H. Ward, Henry Williams, David Wilson, &c.

Officers.—Sir Ernest Clarke, Secretary; Dr. J. Augustus Voelcker, Consulting Chemist; Mr. F. S. Courtney, Consulting Engineer; Mr. J. E. Compton-Bracebridge, Assistant Director; Mr. R. S. Burgess, Superintendent of the Showyard; Mr. Ernest H. Godfrey, Assistant Editor.

H.R.H. the PRESIDENT, in opening the proceedings, said that the members would understand that, as the report could only be settled by the Council at their meeting held the previous day, it was impossible to circulate it beforehand amongst the members, as was done in the case of the Anniversary General Meeting on May 22, when the report was settled a fortnight before the meeting. He would now call upon the Secretary to read the report, copies of which were in the hands of the members present.

Adoption of Report.

The SECRETARY having read the principal paragraphs of the report of the Council for the past half year (see p. 208),

Mr. CHRISTOPHER MIDDLETON moved its adoption. He did not propose to go into the question of the migratory shows coming to an end; but he thought they might congratulate themselves upon the generous response which had been made to the appeal for funds with which to make a permanent showyard. A most satisfactory feature in the report was the fact that the country was free from foot-and-mouth disease, and he thought they might venture to hope that as long as the present policy was adhered to of not allowing live animals to be imported from abroad they would be able to keep a clean bill of health.

Mr. J. T **Hobbs**, in seconding the motion, said he could not help feeling that the members were deeply indebted to the Council for the efforts which had resulted in such a handsome balance at the Cardiff Meeting. They were also indebted to the Government for having stamped out foot-and-mouth disease, and he sincerely trusted that they would think it proper within a very short time to notify to foreign Governments, who were debarring our pedigree live stock from entering their countries, that this country was now free from the disease; so that they might be able to send their stock to those countries under the conditions that previously existed.

Surgeon Lieut.-Colonel **Ince** drew attention to what appeared to him to be a most important subject. Next year would see the last of the so-called migratory or peripatetic shows, and the land for a permanent showyard had been purchased. Henceforth, for some time to come, the shows, if they took place at all, would be stationary. There might be many amongst the members who looked forward to a period of prosperity, but he thought there were reasons for not being too sanguine upon that matter. The shows of the "Royal" Society during the sixty or seventy years of their existence had, upon the whole, been prosperous. They had been successful from the pecuniary point of view; but had produced a family of children. Local societies had sprung up in all parts of the country. He had had an opportunity of looking at the ground on the borders of the parish of Willesden. It was a very pretty part of the country: it was a nice piece of agricultural and pastoral land, and altogether certainly looked very attractive. The purchase of the land was, however, a comparatively small item. The cost of the land, the cost of legal expenses and of the roads which would have to be made, would come to about 30,000*l.*; but to fit this ground for a permanent showyard, he did not think any calculation had been made as to what the expense would be. He should be surprised if the cost of draining the site, laying on gas and water, fencing, &c., did not come to at least another 40,000*l.* Where was this sum to come from? Out of 10,000 members, some 376 had been good enough to subscribe or promised to subscribe a sum sufficient to pay for the land. It was really gratifying to remember that, while about 4 per cent. had subscribed to the Fund, there remained no less than 96 per cent. still to send contributions. Therein lay their hope of providing for the necessary expenses of laying out the ground and providing, perhaps, some little reserve for future expenses connected with the ground. He hoped he would be excused for dwelling on this particular subject, but it was very important, and he did not think that sufficient attention had yet been given to it.

Mr. H. S. **Daine** said he saw no indication as to when they would hear further about the Hills Experiments. These Pot Experiments were very important, and he was of opinion that an interim report should be published. Referring to the paragraph setting forth the number of samples of seeds tested by the Society's Consulting Botanist, he would like fuller details given, showing the number sent for report from each county of England, so that the members might know the extent of the Botanical Department of the Society. In the presence of the President of the Board of Agriculture, he wished to emphasise the necessity for the establishment of a central seed-testing station in this country, notwithstanding the opinion of their eminent botanist, Mr. Carruthers. He was satisfied that it would be to the general benefit of farmers to have such a station, and he hoped the President of the Board of Agriculture would take the matter up and carry it through. Now that the question of the stationary show was settled, he hoped that it would be successful; but he had no hesitation in saying that in his opinion it would have been better had the Council taken the members into their confidence before coming to a final and definite conclusion. Now, however, that it had been settled, let them all pull together to make it a success.

Mr. BOWEN-JONES said that perhaps, as Chairman of the Chemical Committee, he might be allowed to answer Mr. Daine with reference to the reports on the Hills Experiments. A full report on these experiments for 1898 and 1899 had been given in the December Journal of 1900, and a further report for the year 1900 would appear in the forthcoming volume (see p. 317).

The report was then adopted.

Vote of Thanks to Auditors.

Mr. W. F. HOLT-BEEVER moved a vote of thanks to Mr. Jonas M Webb, Mr. Henry Grinling, and Mr. Hubert J. Greenwood for their services as Auditors during the past year. He also proposed the re-election as Auditors for the ensuing year of Messrs. Webb and Greenwood, and that Mr. N. P. Squarey, of Bemerton, Salisbury, be elected Auditor in the room of Mr. Grinling, who, through pressure of other engagements, did not offer himself for re-election

Mr. T. CARRICK seconded the motion, and it was adopted.

H.R.H. THE PRESIDENT then put the usual inquiry as to whether any Governor or Member had any remark to make or suggestion to offer that might be referred to the Council for consideration.

No one rising to make any suggestion,

Vote of Thanks to the Chairman.

The Right Hon. R. W. HANBURY, M.P., moved a vote of thanks to His Royal Highness the President for occupying the Chair that day. He said that the task with which he was charged was not a very difficult one. They all knew of the great interest that the late Queen and the present King had taken in agriculture, and the encouragement they had given to that industry. It was therefore especially pleasing to the members of the Royal Agricultural Society to be presided over this year by another member of the Royal Family. They all hoped that the ensuing year would be a successful one for the Society, and that its Meeting, to be held at Carlisle under His Royal Highness's Presidency, would be as successful as the show held at Cardiff this year.

Perhaps he might be allowed to take the opportunity of referring to a resolution passed by the Council of the Society on the previous day, with the strong arguments in favour of which he confessed he was to a very great degree in sympathy. That resolution referred, of course, to the trade with the Argentine. He was sure that the Society would not wish for a moment that any sort of bargain should be struck with Argentina. It would not be desired that if there were any doubts as to whether foot-and-mouth disease continued to exist in the Argentine we should declare that our ports would be open to that country on condition that they on their part let in our pedigree stock. We must, whatever be the consequences, keep this country free from all risk of foot-and-mouth disease. That was the line that had been taken hitherto, and the Board of Agriculture must strictly adhere to it. The Argentine Government had made a declaration, so far back as December last, to the effect that in their opinion their country was free from foot-and-mouth disease. Perhaps because we were a very practical nation, we had not hitherto been accustomed to receive implicitly these official declarations, because we felt that we could not give an official declaration of the kind ourselves. It was really impossible to assert a negative in the case of such an insidious and subtle disease as that of foot-and-mouth (which might be lurking latent in the country, and might break out at any time) and make an official declaration that such disease did not exist in this country. With regard to the Argentine, although these declarations were made, he believed, in the most absolute good faith, and it would be perfectly preposterous to question them for a single moment, yet undoubtedly, even so late as July last, reports had been received which went to show that, whilst there was no epidemic raging there, still foot-

and-mouth disease did exist in a mild form in the Pampas centre.

There was, however, another important fact in connection with this question of trade with the Argentine, viz., that regulations did exist both in Argentina and Uruguay to the effect that until the Government of any country over seas declared officially that their country was free from foot-and-mouth disease, no cattle, sheep, swine, or goats should be landed in either of those countries. It would be noticed that this was only a declaration in regard to animals from over seas. Of course there was a land boundary between Uruguay and the Argentine, and there was, he believed, in existence an official permission for cattle to pass freely between these two countries. Even if there were not, however, such an official permission, one would recognise that it was very difficult to draw a line, and absolutely prevent cattle from passing from one country to the other. With regard to Uruguay, it was known that that country had received—in spite of the regulations which forbade them to import cattle from over seas, from countries in which the disease was believed to be prevalent—a cargo of rams which arrived in the harbour of Monte Video on July 29 last, and it was said that those rams were infected with foot-and-mouth disease. Whether that was a fact or not, they undoubtedly came from a country where foot-and-mouth disease was rampant at the present time. That showed that they had to be very careful in these matters. The Board of Agriculture was anxious to afford every possible help to breeders of pedigree stock, but they could not avoid drawing their own conclusions from the facts, and they could not conclude that the Argentine was absolutely free from disease

With regard to themselves, and the declaration which it had been suggested that the Board should officially make, just as they did not believe that it was possible for any foreign Government, especially where the disease had been so very widely spread and where the country was very large, to assert a negative and declare that no disease existed in that country, so the Board of Agriculture recognised that it was equally difficult for them to state officially that there was no foot-and-mouth disease in this country. Although the Board firmly believed that there was no foot-and-mouth disease in this country at the present time, and although there had been no infected place since June 1, and no outbreak since April 11, still, as the disease was so subtle and broke out so suddenly, it was felt to be very difficult for them to make any official and unqualified declaration on the subject. For these reasons it had not been their habit to make any official declarations of this kind. He was afraid he was very radical in not caring much for the mere traditions of an office, and if it were possible to assist in any way the exporters of pedigree stock by making a qualified declaration that to the best of their belief foot-and-mouth disease does not exist in this country, that since June 1 there had been no infected place, and that since April 11 there had been no outbreak, they were perfectly prepared to make a statement of that kind; and, in his opinion, this ought to be done.[1] (Cheers.) He was glad to think that if this were done it would be sufficient to satisfy the Society.

He recognised that this question of disease was a most important part of their work at the Board of Agriculture; and he hoped they would agree with the recent steps they had taken with regard to swine fever, which had considerably diminished, although, of course, at this time of the year the disease generally did diminish. The Board had issued new regulations with regard to dealers, they had done their best to appoint skilled veterinary surgeons to whom could be entrusted greater responsibilities with regard to slaughter than had been possible in the case of the ordinary veterinary surgeon. Above all, the Board were having a more scientific investigation made into swine fever than had ever been made before. They recognised that there was a great deal of ignorance of the nature of this disease, not only in England, but also on the Continent. He had convinced himself on this point when he had the pleasure of meeting the representatives of foreign veterinary science at the recent Congress on Tuberculosis. The Board were also dealing with louping-ill, braxy, and glanders; and he hoped that the Society would feel that in really trying to get to the bottom of these diseases they were doing a useful work. (Hear, hear.) He moved a hearty vote of thanks to His Royal Highness the President for occupying the Chair that day.

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[1] On December 18 the following official notice was issued: "The Board of Agriculture desire to give publicity to the fact that no case of foot-and-mouth disease has been reported to have occurred in the United Kingdom since the 11th April last, and that the premises then declared to be infected with that disease were declared to be free from that disease on the 1st June last. The Board have every reason to believe that foot-and-mouth disease does not now exist in the United Kingdom.—T. H. Elliott, *Secretary*."

The Rev. Dr. GILLESPIE begged with great cordiality to second the motion which had been proposed by Mr. Hanbury; and as a member of that great Society, coming from north of the Border, he wished to assure them that the people of Scotland would do all that they could to assist in making the Society's Meeting at Carlisle next year as successful as possible. As a member hailing from Scotland of the Joint Board managing the examinations for the diplomas in Agriculture and Dairying, he should like to be permitted to offer his testimony to the very satisfactory working of that Board. In his opinion, it was a very admirable thing that the two great societies had entered into partnership in this manner. The Royal Agricultural Society of England was, of course, the predominant partner; but the members of the Board from Scotland felt great admiration at the manner and spirit in which the English representatives had carried out this business, and he begged to congratulate all concerned on the most successful arrangements made during the past year.

The SECRETARY then put the motion, and it was carried unanimously.

H.R.H. THE PRESIDENT, in reply, said it had been a great pleasure to him to be present at that well-attended meeting, and he thanked the members for their presence. He was very glad to see the unanimity that had been displayed, and that they had had no controversial matter to discuss. He was doubly thankful to his Right Honourable friend the President of the Board of Agriculture for having taken the opportunity of making the very interesting statement that they had all heard with so much satisfaction and pleasure; and he thought they would now be perfectly content to leave this matter in the hands of the Government, because they had heard that day of the great interest which was taken in this question, and how they were trying to grapple with the difficulty. He was also glad to hear of the efforts that were being made to stamp out swine fever, and he hoped that they would eventually be free from the curse which these diseases were to their stock.

The proceedings then terminated.

Notice is hereby given that the Sixty-Third Anniversary Meeting of Governors and Members of the Royal Agricultural Society of England will, in accordance with Clause 6 of the Charter, be held at the Society's House, 13, Hanover Square, London on Thursday, May 22, 1902, at Noon, when the Half-yearly Report of the Council will be read, and the Election of the President, Trustees, and Vice-Presidents, and of Twenty-five Members of Council will take place.

ERNEST CLARKE, *Secretary.*

13, Hanover Square, London, W.
December, 1901.

DONATIONS TO PERMANENT SHOW FUND.

ACTING upon the decision arrived at by the Council on June 5, 1901 (see page lxvi), the following Appeal was issued on June 17 for Funds for the purchase and preparation of the Site in the Metropolis which has been selected for the future Permanent Showyard of the Society.

The preliminary List of Subscriptions circulated with the Appeal was headed by a Donation of 250 guineas from His Majesty the King, who graciously expressed his interest and satisfaction at the decision of the Council, and intimated that it would be a source of great pleasure to him to learn that the sum required for the purchase of the Site would soon be forthcoming.

MEMORANDUM AS TO PERMANENT SHOWYARD FOR NATIONAL AGRICULTURAL SHOW.

1.—Owing to the impossibility, from various causes beyond the Society's control, of the Society continuing for the future the system of migratory Annual Shows in different provincial towns in various parts of England, it has been under the necessity of finding some permanent location in which its Annual Exhibitions can be held for the future; and London, as the Capital of the Empire, has been decided upon as the most fitting place for the National Agricultural Show.

2.—After much inquiry and careful deliberation by a Special Committee, consisting of the Hon. Cecil Parker, Sir Walter Gilbey, Bart., Col. Sir Nigel Kingscote, K.C.B., Sir Jacob Wilson, Mr. Percy Crutchley, Mr. J. M. Dugdale, Mr. Wm. Frankish, Mr. H. D. Marshall, Mr. G. H. Sanday, and Mr. E. W. Stanyforth, a Site for such Showyard has been selected on land lying between Willesden and Ealing, at one boundary of which the new direct line of the Great Western Railway from Paddington to Wycombe (now in course of construction) will run.

3.—The Society has entered into an arrangement for the purchase of the Freehold of 100 acres of this land, which the Council consider very suitable for the purposes of a Permanent Showyard. To acquire the land, and for incidental expenses in connection therewith, a sum of not less than 30,000*l*. is required.

4.—The Society has in the past spent its annual revenue in various directions for its Charter-object of "the general advancement of English Agriculture"; and it is not in the position of having free capital which it can expend in the purchase of a Permanent Showyard.

5.—The Society has, throughout its 63 years of existence, borne the cost of maintaining the system of a great National Show, at which all departments of agricultural enterprise are represented. It appeals, therefore, to those interested in the National Agricultural Show and in the success of Agriculture in this country for financial contributions towards the cost of acquiring its proposed Permanent Showyard.

(Signed) CAWDOR, *President.*
WALTER GILBEY, { *Hon. Treasurer to the Fund.*
ERNEST CLARKE, *Secretary.*

13, Hanover Square, London, W.
June 17, 1901.

The following Donations to the Fund have been received up to December, 1901. Further subscriptions are necessary to enable the Society to equip the Site—which has now been purchased and is in the Society's possession—with the necessary appliances (drainage, gas and water piping, fencing, roads, etc.), and with the requisite buildings, such as permanent stabling and the more substantial structures of a Showyard.

It is requested that any such contributions may be sent addressed to The Secretary, Royal Agricultural Society of England, 13, Hanover Square, London, W., and that cheques may be crossed "London and Westminster Bank."

	£	s.	d.
HIS MOST GRACIOUS MAJESTY THE KING.	262	10	0
H.R.H. THE PRINCE OF WALES, K.G.	105	0	0
H.R.H. PRINCE CHRISTIAN, K.G.	25	0	0

	£	s.	d.
The Earl of Derby, K.G. (£1,000 a year for 5 years).	5,000	0	0
The Duke of Westminster	1,000	0	0
Viscount Portman	1,000	0	0
Sir Walter Gilbey, Bart.,	1,000	0	0
Sir J. Blundell Maple, Bart., M.P.	1,000	0	0
Mr. William Waldorf Astor	1,000	0	0
Mr. Herbert B. Cory	500	0	0
The Ecclesiastical Commissioners	500	0	0
Mr. Alexander Henderson, M.P.	500	0	0
Col. H. L. B. McCalmont, C.B., M.P.	500	0	0
Lord Rothschild	500	0	0
Lord Tredegar	500	0	0
Mr. F. D. Lambert	262	10	0
Messrs. Aveling & Porter, Ltd	250	0	0
Messrs. E. H. Bentall & Co.	250	0	0
Mr. Albert Brassey, M.P.	250	0	0
Lord Burton	250	0	0
Sir Ernest Cassel, K.C.M.G.	250	0	0
Earl Cawdor	250	0	0
Messrs. Clayton & Shuttleworth, Ltd.	250	0	0
Messrs. John Fowler & Co. (Leeds), Ltd.	250	0	0
Messrs. Richard Garrett & Sons, Ltd.	250	0	0
Messrs. Harrison, McGregor & Co., Ltd.	250	0	0
Messrs. R. Hornsby & Sons, Ltd.	250	0	0
Messrs. Jas. & Fredk. Howard	250	0	0
Messrs. Marshall, Sons & Co., Ltd.	250	0	0
Messrs. Ransomes, Sims and Jefferies, Ltd.	250	0	0
Honble. W. F. D. Smith, M.P.	250	0	0
Mr. Edward David Stern	250	0	0
Mr. Walter Shoolbred	210	0	0
Lord Calthorpe	200	0	0
Mr. Victor C. W. Cavendish, M.P.	200	0	0

Earl Fitzwilliam	200	0	0
Lord Iveagh	200	0	0
Lord Llangattock	200	0	0
Mr. James C. Marshall	200	0	0
The Lady Wantage	200	0	0
Mr. Charles Gassiot	150	0	0
Mr. John Barker, J.P.	105	0	0
Mr. Thos. F. Blackwell	105	0	0
Sir James Blyth, Bart.	105	0	0
Mr. J. A. Fielden	105	0	0
Mr. W. Edgar Horne	105	0	0
Mr. T. Simpson Jay	105	0	0
Mr. Richard Lambert	105	0	0
Sir Oswald Mosley, Bart.	105	0	0
Mr. Fredk. Shoolbred	105	0	0
Mr. H. H. Smith-Carington	105	0	0
Lord Amherst of Hackney	100	0	0
Mr. Peter Coats	100	0	0
Mr. F. S. W. Cornwallis	100	0	0
Messrs. Debenham, Tewson & Co.	100	0	0
Lord Howard de Walden	100	0	0
Trustees of T. W. Douglas-Willan	100	0	0
Messrs. Fremlin Bros.	100	0	0
The Earl of Jersey, G.C.B.	100	0	0
Mr. James Mason	100	0	0
Mr. W. Morrison	100	0	0
Mr. F. E. Muntz	100	0	0
Mr. Richard Oswald	100	0	0
Lord Penrhyn	100	0	0
Sir W. Cuthbert Quilter, Bart., M.P.	100	0	0
The Duke of Richmond and Gordon, K.G.	100	0	0
Viscount Ridley	100	0	0
Mr. Howard P. Ryland	100	0	0
Baron J. H. W. Schröder	100	0	0
Earl Spencer, K.G.	100	0	0
Mr. E. W. Stanyforth	100	0	0
Mr. Julius Wernher	100	0	0
Messrs. Thomas Wilson, Sons & Co., Ltd.	100	0	0
Mr. E. J. Wythes	100	0	0
Messrs. Robert Ingham Clark and Co., Ltd.	52	10	0
The Earl of Ducie	52	10	0
Liebig's Extract of Meat Co., Ltd.	52	10	0
Right Hon. Sir Massey Lopes, Bart.	52	10	0
Mr. W. Lund	52	10	0

	£	s.	d.
Messrs. Mappin and Webb, Ltd.	52	10	0
Messrs. Augustus Voelcker and Sons	52	10	0
Mr. J. C. Williams	52	10	0
Viscount Baring	50	0	0
Sir F. T. Barry, Bart., M.P.	50	0	0
Mr. Frank Bibby	50	0	0
Mr. Michael Biddulph	50	0	0
Messrs. Blackstone & Co., Ltd.	50	0	0
Mr. H. L. C. Brassey	50	0	0
Lord Brougham and Vaux	50	0	0
Messrs. Charles Burrell & Sons, Ltd.	50	0	0
The Earl of Camperdown	50	0	0
The Earl of Coventry	50	0	0
The Earl of Crewe	50	0	0
The Earl of Dartmouth	50	0	0
Mr. W. H. Foster	50	0	0
Lord Glanusk	50	0	0
Mr. William Graham	50	0	0
Messrs. J. & H. Gwynne, Ltd.	50	0	0
Mr. E. Heinemann	50	0	0
Mr. R. W. Hudson	50	0	0
Sir Edwin D. Lawrence, Bart., M.P.	50	0	0
Lord Leconfield	50	0	0
The Earl of Leicester, K.G.	50	0	0
Lord Middleton	50	0	0
Mrs. Montefiore	50	0	0
Mr. P. Albert Muntz, M.P.	50	0	0
Mr. Albert Pell	50	0	0
Colonel Henry Platt, C.B.	50	0	0
The Hon. Henry Portman	50	0	0
The Earl of Portsmouth	50	0	0
The Earl of Rosebery, K.G.	50	0	0
Miss Alice de Rothschild	50	0	0
Mr. Leopold de Rothschild	50	0	0
Dowager Duchess of Sutherland	50	0	0
Messrs. Tattersall	50	0	0
Mr. John Unite	50	0	0
Mr. Victor W. B. Van de Weyer	50	0	0
Messrs. W. H. Willcox & Co., Ltd.	50	0	0
Sir W. H. Wills, Bart.	50	0	0
Mr. R. M. Greaves	30	0	0
Mr. C. W. Bartholomew	26	5	0
Messrs. Charles Cammell & Co.	26	5	0
Mr. Godfrey L. Clark	26	5	0
Messrs. Day, Son & Hewitt	26	5	0
Mr. Newton Dunn	26	5	0
Messrs. R. Hunt & Co., Ltd.	26	5	0
Mr. F. C. Southwell	26	5	0
Mr. J. H. Arkwright	25	0	0

	£	s.	d.
Mr. Hugh Baker	25	0	0
Mr. Lawrence J. Baker	25	0	0
Mr. Gardner S. Bazley	25	0	0
Mr. Hy. E. Beddington	25	0	0
Viscount Bridport, G.C.B.	25	0	0
Mr. R. Nicholl Byass	25	0	0
Lt.-Col. the Hon. G. Windsor Clive	25	0	0
Messrs. Clutton	25	0	0
Mr. C. T. D. Crews	25	0	0
Mr. Percy Crutchley	25	0	0
Mr. George Dalton	25	0	0
Mr. A. E. W. Darby	25	0	0
Messrs. Day & Sons, Crewe	25	0	0
Mr. J. Marshall Dugdale	25	0	0
Mr. R. Forrest	25	0	0
Mr. T. C. Garth	25	0	0
Mr. J. S. Pearson Gregory	25	0	0
Mr. James Grimble Groves, M.P.	25	0	0
Mr. Walter A. Hankey	25	0	0
Messrs. Harrison & Co.	25	0	0
Mr. Frederic J. Harrison	25	0	0
Mr. A. W. Hickling	25	0	0
Colonel Sir Nigel Kingscote, K.C.B.	25	0	0
Messrs. Leigh & Sillavan	25	0	0
The McCormick Harvesting Machine Co.	25	0	0
Earl Manvers	25	0	0
The Massey-Harris Co., Ltd.	25	0	0
Mr. C. Moorsom Maude	25	0	0
Lord Moreton	25	0	0
Mr. Arthur H. Newton	25	0	0
Messrs. D. M. Osborne & Co.	25	0	0
Mr. G. W. Palmer, M.P.	25	0	0
Mr. Edmund Peel	25	0	0
Mr. John William Philips	25	0	0
Mr. Edward Pilkington	25	0	0
The Plano Manufacturing Co.	25	0	0
Hon. E. W. B. Portman	25	0	0
Mr. Frederick Reynard	25	0	0
Mr. Alfred de Rothschild	25	0	0
Mr. Leopold Salomons	25	0	0
Mr. George H. Sanday	25	0	0
Sir Berkeley Sheffield, Bart.	25	0	0
Mr. C. A. Smith-Ryland	25	0	0
Mr. John Snelgrove	25	0	0
Sir John H. Thorold, Bart.	25	0	0
Mr. R. A. Warren	25	0	0
Mr. Vernon Watney	25	0	0
Mr. Charles Whitehead	25	0	0
Mr. Henry Williams	25	0	0
Sir Frederick Wills, Bart.	25	0	0
Mr. Frederick Wolfe	25	0	0
The Walter A. Wood M. & R. Machine Co.	25	0	0
Mr. Alfred Ashworth	21	0	0
Mr. W. C. Cartwright	21	0	0
Messrs. Sexton, Grimwade & Beck	21	0	0
Messrs. Woodhouse & Rixson	21	0	0

	£	s.	d.
Mr. Robert Blezard	20	0	0
Mr. Sidney Hill	20	0	0
Mr. William Jones	20	0	0
Honble. Cecil T. Parker	20	0	0
Messrs. Rawlence & Squarey	20	0	0
Sir C. C. Smith, Bart.	20	0	0
Mr. Harold Swithinbank	20	0	0
Capt. W. H. O. Duncombe	15	0	0
Mr. G. Anthony Fenwick	15	0	0
Mr. R. C. Assheton	10	10	0
Mr. W. F. Holt Beever	10	10	0
Messrs. Thos. Bradford & Co.	10	10	0
Admiral the Hon. W. C Carpenter	10	10	0
Mr. Henry Charrington	10	10	0
Mr. J. Howard Colls	10	10	0
Messrs. Wm. Cooke & Co., Ltd.	10	10	0
Mr. Frank Debenham	10	10	0
Mr. T. A. Dickson	10	10	0
Col. Sir R. Gunter, Bt., M.P.	10	10	0
Mr. W. Hollins	10	10	0
Earl Howe	10	10	0
Mr. Thomas Kemble	10	10	0
Messrs. Mulliners, Ltd.	10	10	0
Mr. C. C. Rogers	10	10	0
Mr. C. A. Scott-Murray	10	10	0
Mr. George Simmins	10	10	0
Mr. Michael Stocks	10	10	0
Mr. J. G. Williams	10	10	0
Mr. T. H. Woods	10	10	0
Messrs. T. W. Beach & Sons, Ltd.	10	0	0
Mr. S. E. B. Bouverie-Pusey	10	0	0
Honble. T. A. Brassey	10	0	0
Mr. John H. Bridges	10	0	0
General Sir C. H Brownlow, G.C.B.	10	0	0
Mr. T. Watson Cadman	10	0	0
Col. C. T. Caldecott	10	0	0
Mr. James Crabtree	10	0	0
Mr. Walter Cunningham	10	0	0
Lt.-Col. Curtis-Hayward	10	0	0
Mr. E. Willoughby Firth	10	0	0
Messrs. James Forshaw & Sons	10	0	0
Mr. William Frankish	10	0	0
Mr. Tresham Gilbey	10	0	0
Sir Richard Glyn, Bart.	10	0	0
The Marquis of Granby	10	0	0
Mr R. Neville Grenville	10	0	0
The Duchess of Hamilton	10	0	0
Lord Harris, G.C.S.I.	10	0	0
Mr. Heath Harrison	10	0	0
Mr. Henry Head	10	0	0
Mr. J. A. Henryson-Caird	10	0	0
Mr. George A. Hodgson	10	0	0
Mr. Charles Jewell	10	0	0
Mr. J. Atkinson Jowett	10	0	0
Mr. N. S. Maskelyne	10	0	0

	£	s	d.
Mr. Henry Mellish	10	0	0
Sir Powlett Milbank, Bart.	10	0	0
Mr. T. Horrocks Miller	10	0	0
Lt.-Col. Sir Audley Neeld, Bart., C.B.	10	0	0
Hon Ralph Nevill	10	0	0
Mr. John N. Norman	10	0	0
Mr. C. R. Palmer-Morewood	10	0	0
Messrs. Daniel de Pass & Co.	10	0	0
Mr. A. E. Pease, M.P.	10	0	0
Mr. E. Lloyd Pease	10	0	0
Lady de Rothschild	10	0	0
Col. A. Saltmarshe	10	0	0
Mr. William John Smith	10	0	0
Mr. Peter Stubs	10	0	0
Mr. John Thornton	10	0	0
Mr. Richard H. Tidswell	10	0	0
Mr. Robert J. Tidswell	10	0	0
Mr. A. Tyrrell	10	0	0
Messrs. Vinton & Co., Ltd.	10	0	0
Sir Charles G. E. Welby, Bart., M.P.	10	0	0
Mr. E. V. V. Wheeler	10	0	0
Mr. A. H. E. Wood	10	0	0
Messrs. Ansell & Sons, Ltd	5	5	0
Mr. John Bellews	5	5	0
Hon. D. P. Bouverie	5	5	0
Sir F. W. Carden, Bart.	5	5	0
Messrs. Champion & Wilton	5	5	0
Mr. A. Hailwood	5	5	0
Surg.-Lt.-Col. J. Ince, M.D.	5	5	0
Messrs. L. R. Knapp & Co.	5	5	0
Mr. W. J. Lancaster	5	5	0
Capt. W. S. B. Levett	5	5	0
Mr. Ernest Mathews	5	5	0
Mr. Thomas Penny, J.P.	5	5	0
Mr. Thomas S. Penny	5	5	0
Messrs. G. Street & Co., Ltd.	5	5	0
Mr. Garrett Taylor	5	5	0
Messrs. B. C. Tipper & Son	5	5	0
Mr. H. H. Vivian	5	5	0
Mr. R. Edmund Anstice	5	0	0
Mr. Arthur Arkwright	5	0	0
Mr. Reginald B. Astley	5	0	0
Mr. L. Ingham Baker	5	0	0
Mr. E. E. Barclay, M.F.H.	5	0	0
Mr. Edward H. Bayldon	5	0	0
Mr. F. T. H. Bernard	5	0	0
Mr. F. Stapleton Bretherton	5	0	0
Mr. S. Brocklehurst	5	0	0
Capt. H. A. Cartwright	5	0	0
Mr. F. C. Champion	5	0	0
Mr. J. J. Chapman	5	0	0
Mr. George Crawhall	5	0	0
Mr. Philip W. Dashwood	5	0	0
Mr. C. Wriothesly Digby	5	0	0
Mr. H. Oakden Fisher	5	0	0
Mr. W. Foster	5	0	0
Mr. W. S. Fox	5	0	0
Mr. B. Glegg	5	0	0
Mr. Walter Hazell	5	0	0
Mr. Bayntun Hippisley	5	0	0

	£	s	d.
Mr. James T. Hobbs	5	0	0
Mr. Henry T. Hodgson	5	0	0
Mr. E. G. S. Hornby	5	0	0
Mr. W. Slingsby Hunter	5	0	0
Mr. Thomas Iredale	5	0	0
Sir Leonard Lyell, Bart.	5	0	0
Mr. Howard Martin	5	0	0
Mr. G. Elliot Meakin	5	0	0
Mr. Percy Mitchell	5	0	0
Mr. J. E. Moore-Gwyn	5	0	0
Mr. George Neve	5	0	0
Mr. P. P. Pennant	5	0	0
Mr. Cudworth H. Poole	5	0	0
Mr. H. Penry Powel	5	0	0
Mr. William A. Prout	5	0	0
Mr. J. Stewart Remington	5	0	0
Mr. F. A. E. Samuelson	5	0	0
Mr. William Sayer	5	0	0
Mr. A. J. Smith	5	0	0
Mr. W. E. M. Tomlinson, M.P	5	0	0
Mr. Charles Watts	5	0	0
Mr. Edward M. E. Welby	5	0	0
Mr. John E. Welby	5	0	0
Mr. E. S. Wilmot-Sitwell	5	0	0
Mr. Henry J. Wilson, M.P.	5	0	0
Mr. E. F. Glynn	4	10	0
Mr. E. Brocklehurst	3	3	0
Mr. Arthur Shepherd	3	3	0
Mr. P. B. Drabble	3	0	0
Mr. James Sinclair	3	0	0
Mr. H. Lyle Smyth	3	0	0
Mr. G. F. Armytage	2	2	0
Sir Randolf Baker, Bart.	2	2	0
Mr. James S. Cooper	2	2	0
Mr. Herbert J. Davis	2	2	0
Mr. James Edwards	2	2	0
Messrs. Hewson, Chapman & Co., Ltd.	2	2	0
Mr. T. Rogers Jones	2	2	0
Prof. W. McCracken	2	2	0
Mr. O. O. Openshaw	2	2	0
Mr. Albert Pulling	2	2	0

	£	s.	d
Mr. Herbert Radcliffe	2	2	0
Mr. J. Wallis Titt	2	2	0
Mr. Frank P. Walker, B.Sc.	2	2	0
Mr. Francis Were	2	2	0
Mr. E. Hobgen	2	0	0
Mr. Frederick Hutton	2	0	0
Mr. George Long	2	0	0
Mr. W. J. Malden	2	0	0
Col. Arthur Mesham	2	0	0
Mr. E. C. Rundle	2	0	0
Mr. T. Percy Sharps	2	0	0
Captain E. W. Smythe	1	10	0
Mr. George Bovill	1	1	0
Mr. T. H. Brigg	1	1	0
Mr. Percy C. Burton	1	1	0
Mr. Edward Davies	1	1	0
Dr. W. Corbin Finch	1	1	0
The Rev. W. R. Findlay	1	1	0
Mr. E. Powell King	1	1	0
Mr. J. E. Mills	1	1	0
Mr. Leopold Paget	1	1	0
Mr. J. B. Paynter	1	1	0
Mr. F. Punchard	1	1	0
Mr. Ebenezer Smith	1	1	0
Mr. C. Newton Taylor	1	1	0
Mr. C. Stanley Williams	1	1	0
Major Lionel Byng	1	0	0
Mr. E. N. Crofts	1	0	0
Mr. J. Percy Dugdale	1	0	0
Mr. James A. Gordon	1	0	0
Mr. J. C. Hatherell	1	0	0
Mr. G. W. O. Huddart	1	0	0
Mr. Arthur Leigh	1	0	0
Mr. James Peter	1	0	0
Mr. Evan Powell	1	0	0
Mr. F. T. S. Rippingall	1	0	0
Mr. H. T. Simmons	1	0	0
Miss Jane Rogers		15	0
Mr. Edward Smith		10	6

CARDIFF MEETING.

JUNE 26 TO JULY 1, 1901.

PRESIDENT:
EARL CAWDOR.

OFFICIALS:

Honorary Director.

PERCY CRUTCHLEY, Sunninghill Lodge, Ascot

Stewards of Live Stock.

J. P. TERRY, Berry Field, Aylesbury, Bucks.
FREDERICK REYNARD, Sunderlandwick, Driffield, Yorks.
J. C. WILLIAMS, Caerhays Castle, St. Austell, Cornwall.
G. H. SANDAY, Highfield, Uxbridge, Middlesex.

Stewards of Implements.

HOWARD P. RYLAND, Moxhull Park, Erdington, near Birmingham.
J. MARSHALL DUGDALE, Llwyn, Llanfyllin, *viâ* Oswestry.
R. M. GREAVES, Wern, Portmadoc, N. Wales.

Steward of Dairying.

E. VINCENT V. WHEELER, Newnham Court, Tenbury, Worcestershire.

Steward of Forage.

RICHARD STRATTON, The Duffryn, Newport, Mon.

Stewards of Finance.

W. FRANKISH, Limber, near Brocklesby, Lincolnshire.
F. S. W. CORNWALLIS, Linton Park, Maidstone, Kent.

Secretary.

Sir ERNEST CLARKE, 13, Hanover Square, London, W.

Assistant Director.	**Supt. of the Showyard.**
J. E. COMPTON-BRACEBRIDGE.	ROBERT S. BURGESS.

JUDGES OF IMPLEMENTS.

Portable Oil Engines.—Class I.
Agricultural Locomotive Oil Engines.—Class II.
Small Ice-Making Plant, suitable for a Dairy.—Class III.

Professor EWING, F.R.S., Langdale Lodge, Cambridge.
J. G. MAIR-RUMLEY, The Hammonds, Udimore, Sussex.

Miscellaneous Implements entered for Silver Medals.

CHARLES P. HALL, Park Farm Office, Woburn R.S.O., Beds.
J. W. KIMBER, Fyfield Wick, Abingdon, Berks

JUDGES OF STOCK, &c.

(*As finally corrected.*)

HORSES.

Hunters.—*Classes* 1, 3, 5–7.

Sir H. F. DE TRAFFORD, Bart., Hill Crest, Market Harborough.

Lord SOUTHAMPTON, Idlicote, Shipston-on-Stour.

Hunters.—*Classes* 2, 4, 8 *&* 9.

Earl of ORKNEY, Wing, Bucks.

J. M RICHARDSON, Healing Manor, Lincolnshire.

Cleveland Bays & Coach Horses. *Classes* 10–12.

ANDREW MOSCROP, Sparrow Park, Marske-by-the-Sea.

JOHN WHITE, Appleton Roebuck, Bolton Percy.

Hackneys.—*Classes* 13–22.

WM. CASE, Tuttington, Aylsham, Norfolk.

T. D. REED, Beeford Grange, Driffield, Yorks.

Ponies, Shetland Ponies, Welsh Mountain Ponies, Harness Horses and Ponies.—*Classes* 23–32 *&* 40–43.

JOSEPH DUNCAN, 121, Desswood Place, Aberdeen

JOHN HILL, Marsh Brook House, Church Stretton, Salop.

Polo Ponies.—*Classes* 33–39.

Captain F. EGERTON GREEN, Hurlingham Club, S W.

Captain W. G. RENTON, Guilsborough House, Northampton.

Shires.—*Classes* 44–50.

F. W. GRIFFIN, Borough Fen, Peterborough.

C. W. TINDALL, Wainfleet, Lincolnshire.

Clydesdales.—*Classes* 51–54.

ADAM GRAY, Ingleston of Borgue, Kirkcudbright, N.B.

WILLIAM CLARK, Netherlea Farm, Cathcart, N.B.

Suffolks.—*Classes* 55–58.

F. S. LEWIN, Holbrook, Ipswich.

CORDY S. WOLTON, Ixworth, Bury St. Edmunds.

Colliery Horses.—*Classes* 59 *&* 60.

JOHN PHILLIPS, Clydach Vale, Rhondda Valley, Glamorganshire.

DAVID REES, Ferndale, Glamorganshire.

Draught Horses.—*Classes* 61–63.

F. W. GRIFFIN, Borough Fen, Peterborough.

C. W. TINDALL, Wainfleet, Lincolnshire.

CATTLE.

Shorthorns.—*Classes* 64–70

ROBERT BRUCE, Leinster House, Dublin.

F. PUNCHARD, Underley Estate Office, Kirkby Lonsdale.

Lincolnshire Red Short-horns. *Classes* 71–74.

R. DAVEY, Worlaby, Lincoln.

T. B. FRESHNEY, South Somercotes, Louth.

Herefords.—*Classes* 75 81.

FRANCIS EVANS, Bredwardine, Hereford.

RALPH PALMER, Nazeing, Waltham Cross, Essex.

Devons.—*Classes* 82–87.

JAMES FORRESTER, Bryanston, Blandford, Dorset.

WILLIAM S. PERRY, Crelake, Tavistock, Devon.

Sussex.—*Classes* 88–92.

A. HEASMAN, Court Wick, Littlehampton.

P. GORRINGE, Bank View, Westham, Sussex.

Longhorns.—*Classes* 93 *&* 94

WILLIAM W. SWINNERTON, Stivichall Grange, Coventry.

Welsh.—*Classes* 95–101.

T. H. VAUGHAN, Sychtyn, Llanerfyll, Welshpool.

O. LLOYD DAVIES, Cefngraig, Nantgaredig, Carmarthenshire.

Red Polled and Aberdeen Angus.—*Classes* 102–106 *&* 107–110.

D. F. SMITH, Easton Park, Wickham Market.

WILLIAM WHYTE, Spott, Kirriemuir, N.B.

Galloways, Highlands and Ayrshires—*Classes* 111–114; 115 *&* 116; 117 *&* 118.

Alex. Y. Allan, Croftgane, Thornhill, Dumfries, N.B.
A. Montgomery, Nether Hall, Castle Douglas, N.B

Jerseys.—*Classes* 119–123.

W. Ashcroft, 13, The Waldrons, Croydon.
Ernest Mathews, Chequers Mead, Potters Bar.

Guernseys.—*Classes* 124–128.

C. A. Barnes, Solesbridge, Rickmansworth, Herts
C. Middleton, Marton, R.S.O., Yorkshire.

Kerry and Dexter.

Classes 129–131 *&* 132–134.

James Robertson, La Mancha, Malahide, co. Dublin.
F. N. Webb, Babraham, Cambridge.

Dairy Cows.—*Class* 135.

George Adams, Wadley House, Faringdon.
H Overman, Kipton House, Weasenham, Swaffham.

SHEEP.

Oxford Downs.—*Classes* 136–140.

George Adams, Wadley House, Faringdon.
H. Overman, Kipton House, Weasenham, Swaffham.

Shropshire Rams.

Classes 141–144.

R. Brown, Ruyton Hall, Ruyton Eleven Towns, Salop.
T. A. Buttar, Corston, Coupar Angus, N.B.

Shropshire Ewes.

Classes 145 *&* 146

C. Coxon, Elford Park, Tamworth.
T. S. Minton, Montford, Shrewsbury.

Southdowns.—*Classes* 147–151.

Hugh Penfold. Selsey, Chichester.
A. Cooper, Norton, Bishopstone, Lewes.

Hampshire Downs.—*Classes* 152–156.

E. Lyne, Hillus, Compton, Winchester.
W. Newton, Crowmarsh Battle, Wallingford.

Suffolks.—*Classes* 157–161.

J C. Dawson, Nacton, Ipswich.
Joseph Flintham, The Hall Farm, Aldeburgh-on-Sea.

Somerset and Dorset Horned.

Classes 162 *&* 163

James Forrester, Bryanston, Blandford
Charles Hawkins, Waddon, Dorchester.

Lincolns.

Classes 164–169.

J. B. Nelson, Risby House, Market Rasen.
Joseph Brocklebank, Carlton-le-Moorland, Newark.

Leicesters.—*Classes* 170–173.

Wm. Marshall, Cottam House, Driffield.
W. H Tremaine, Sherborne, Northleach, Gloucestershire.

Cotswolds.—*Classes* 174–177.

Davis Brown, Marham Hall, Downham Market.
J. F. Attwater, Dry Leaze, Cirencester.

Border Leicesters and Cheviots.

Classes 178–181 *and* 193 & 194.

G. Douglas, Hindhope, Jedburgh, N.B.
G. Laing, The Grange, New Etal, Cornhill-on-Tweed.

Kentish or Romney Marsh.

Classes 182 *&* 183.

F. de B. Collard, Minster Abbey, Ramsgate.
Arthur Finn, Westbrooke, Lydd.

Wensleydales.—*Classes* 184 *&* 185.

J. Heugh, Mudd Fields, Bedale.
R. Capstick, Bramhaw, Sedbergh.

Devon Long-woolled.

Classes 186–188.

J. Brocklebank, Carlton-le-Moorland, Newark.
E. R. Berry Torr, Westleigh House, Bideford.

Dartmoor and Exmoor.

Classes 189–190 *&* 191–192.

A. S. Lovelace, Leigh, Dulverton.
R. S. Luscombe, Wisdome Cornwood, Ivybridge, Devon.

Black-faced Mountain and Herdwicks.

Classes 195–196 *&* 197–198.

W. Abbot, Beckstones, Thornthwaite, Keswick.

J. Macfarlane, Penchrise Farm, Stobs, Hawick, N.B.

Welsh Mountain and Radnor.

Classes 199–201 *&* 204.

D. Davies, Velindre, Lampeter, S. Wales.

W. Owen, Faenol Fawr, Rhuddlan, N. Wales.

Ryeland.—*Classes* 202 *&* 203.

F. Evans, Bredwardine, Hereford.

J. H. Yeomans, Stretton House, Hereford.

PIGS.

Whites.—*Classes* 205–216.

Lt.-Col. F. A. Walker-Jones, Burton, Westmorland.

A. F. Nichol, Bradford, Belford.

Berkshires.—*Classes* 217–220.

A. S. Gibson, Ruddington, Nottingham.

P. Stevenson, The Chantry, West Tanfield, Bedale.

Tamworth and Blacks.

Classes 221–224, 225 *&* 226.

G. F. Hempson, Good Hall, Ardleigh, Essex.

John Norman, Cliff House, Tamworth.

POULTRY.

Classes 227–316.

D. Bragg, Aikton, Wigton, Cumberland.

A. C. Major, Ditton, Langley, Bucks.

J. P. W. Marx, Basford, Nottingham.

PRODUCE.

Butter.—*Classes* 317–320.

Professor Carroll, Albert Farm, Glasnevin, Dublin.

D. A. Gilchrist, The College, Reading.

Cheese.—*Classes* 321–329.

John Benson, Dale Road, Buxton.

H. Hewitt, 105 Victoria Street, S.W.

Cider and Perry.—*Classes* 330–333.

F. I. Hayes, The Elms, West Pennard, Glastonbury.

Hives and Honey.—*Classes* 334–357.

W. B. Carr, 17 King William Street, W.C.

Henry Jonas, Portley Wood, Whyteleafe, Surrey.

COMPETITIONS.

Horse-shoeing.

John M. Parker, M R.C.V.S., 40, Cannon Street, Birmingham.

John Malcolm, F R C V.S., Holliday Street Wharf, Birmingham.

Butter-making.

Professor Carroll, Albert Farm, Glasnevin, Dublin.

D. A. Gilchrist, The College, Reading.

Horse-jumping.

Lord Southampton, Idlicote, Shipston-on-Stour.

R. Forrest, St. Fagan's, Cardiff.

H. P. Jenkins, Frenchay Park, Bristol.

H. Lewis, Green Meadow, Cardiff.

Timbering and Rope Splicing.

J. Griffiths, Cymmer, near Pontypridd.

Rees Llewellyn, Bwllfa Dare, Aberdare.

VETERINARY INSPECTORS.

John Blakeway, F.R.C.V.S., Upper Dean Street, Birmingham.

W. J T. Bower, M.R.C.V.S., East Rudham, Swaffham.

Professor Hobday, F.R.C V.S., 27, Lower Phillimore Place, W.

W. Hunting, F.R.C.V.S., 16, Trafalgar Square, Chelsea, S.W.

H. G. Lepper, M.R.C.V.S., Walton Street, Aylesbury.

Professor Macqueen, F.R.C.V.S., Royal Veterinary College, Camden Town, N.W.

John Malcolm, F.R.C.V.S., Holliday Street Wharf, Birmingham.

Harry Moore, M.R.C.V.S., Worksop, Notts.

John M. Parker, M.R.C.V.S., 40, Cannon Street, Birmingham.

Professor Penberthy, F.R.C.V.S., Royal Veterinary College, Camden Town, N.W.

Clement Stephenson, F.R.C.V.S., Sandyford Villa, Newcastle-on-Tyne.

AWARDS OF PRIZES AT CARDIFF.

ABBREVIATIONS.

I., First Prize. II., Second Prize. III., Third Prize. IV., Fourth Prize.
R. N., Reserve Number. H. C., Highly Commended. Com., Commended.

N.B.—The responsibility for the accuracy of the description or pedigree, and for the eligibility to compete of the animals entered in the following classes, rests solely with the Exhibitors.

Unless otherwise stated, each Prize Animal in the Classes for Horses, Cattle, Sheep, and Pigs was "bred by Exhibitor."

HORSES.

Thoroughbred Stallions.

Winners of the Four King's Premiums of £150 *each, awarded by the Royal Commission on Horse Breeding at the* Spring Show, *held at* The Royal Agricultural Hall, London, *March* 12–15, 1901, *for Thoroughbred Stallions serving Mares during the Season of* 1901 *in District F—Gloucestershire, Herefordshire, Monmouthshire, Shropshire, Staffordshire, Warwickshire, Worcestershire, and South Wales, and of the Gold Medals, or* £10 *each, awarded by the Cardiff Local Committee.*

A. Lewis James Shirley, Red House, Ely, Glamorganshire, for **Alvin**, chestnut, foaled 1890; *s.* Master Kildare, *d.* Nightgear *by* King Alfred, *g. d.* Bedgown *by* Bedminster.

B. Stephen Mumford, Stud Farm, Moreton Morrell, Warwickshire, for **Faute-de-Mieux**, brown, foaled 1892; *s.* Torpedo, *d.* Rinovata *by* Wenlock, *g. d.* Traviata *by* Cremorne; bred by Sir Simon M. Lockhart, Bart.

C. Frederick William Barling, The New House, Ross, Herefordshire, for **Swallowfield**, dark brown, foaled 1887; *s.* Wenlock, *d.* Hirondelle *by* Adventurer, *g. d.* Lady Langden *by* Kettledrum; bred by Lord Abingdon.

D. Gilbert Leigh Abbot, Abbot's Leigh, Bristol, for **Toboggan**, chestnut, foaled 1892; *s.* Marioni, *d.* Tom Tom *by* Kettledrum, *g. d.* Disguise *by* Thormanby.

Hunters.

No. in Catalogue.

Class 1.—*Hunter Mares (with Foals at foot),* 15 *stone and upwards.* [3 entries.]

3 **I.** (£20.)—Alfred Hopcraft, Brackley, Northamptonshire, for **Donishall**, grey, aged [foal *by* Basuto], breeder unknown.

1 **II.** (£10.)—John Barker, The Grange, Bishop's Stortford, Herts, for **Stella 2083**, chestnut, foaled 1893 [filly foal *by* Scarlet Letter], bred by P. Shelly, Ballywater, Kilkenny; *s.* Herbertstown, *d. by* The Lawyer.

2 **R. N. & H. C.**—W. M. Harrison, Burton Fields, Stamford Bridge, for **Patti**.

Class 2.—*Hunter Mares (with Foals at foot),* 12 *to* 15 *stone.* [3 entries, 1 absent.]

6 **I.** (£20.)—Frank B. Wilkinson, Cavendish Lodge, Edwinstowe, Newark, Notts, for **Lady Grosvenor 779**, bay, foaled 1889 [foal *by* Havoc], bred by R. T. Greaves, E. Carlton, Uppingham; *s.* Westminster.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 3.—*Hunter Mares or Geldings, up to* 15 *stone, foaled in* 1895 *or* 1896.[1] [8 entries, 5 absent.]

8 I. (£25.)—HERBERT B. CORY, Druidstone, Castleton, Cardiff, for **St. Mallow**, chestnut gelding, foaled 1895, breeder unknown.

12 R. N. & H. C.—THE MACKINTOSH OF MACKINTOSH, for **Marmion.**

Class 4.—*Hunter Mares or Geldings, up to* 12 *stone, foaled in* 1895 *or* 1896.[1] [7 entries, 5 absent.]

18 I. (£20.)—JOHN DRAGE, Chapel Brampton, Northampton, for **Bryan**, chestnut gelding, foaled 1895, breeder unknown.

17 II. (£10.)—HERBERT B. CORY, Druidstone, Castleton, Cardiff, for **St. Donats**, brown gelding, foaled 1896, breeder unknown.

Class 5.—*Hunter Mares or Geldings, foaled in* 1897.[1] [6 entries, 1 absent.]

24 I. (£20.)—HERBERT B. CORY, Druidstone, Castleton, Cardiff, for **St. Fagans**, brown gelding, bred by the late Lord Kensington; *s.* Glory Smitten.

22 R. N. & H. C.—HERBERT B. CORY, for **St. Austell.**

Class 6.—*Hunter Geldings, foaled in* 1898.[1] [6 entries, 2 absent.]

28 I. (£15.)—HERBERT B. CORY, Druidstone, Castleton, Cardiff, for **St. Mellons**, chestnut, bred by R. Duggleby, Sherburn, Yorks; *s.* Dermod, *d. by* Conductor.

30 II. (£10.)—MRS. MARY LEWIS, Clynfiew, Boncath R.S.O., Pembrokeshire, for **Harlequin**, bay; *s.* Pantaloon, *d.* Duchess 525 *by* Mariner.

31 R. N. & H. C.—EDWIN NICHOLS, Worcester, for **Jeddah.**

Class 7.—*Hunter Fillies, foaled in* 1898. [1 entry.]

34 I. (£15, & R. N. for Champion.[2])—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, for **Castaway** 1819, bay, bred by John T. Smurthwaite, Sutton, Retford; *s.* Kilmarnock, *d. by* President.

Class 8.—*Hunter Fillies, foaled in* 1899. [4 entries, 1 absent.]

36 I. (£15, & Champion.[2])—J. WYNFORD PHILIPPS, M.P., Lydstep Haven, Penally, Pembrokeshire, for **Flyaway** 1873, bay; *s.* Pirate II., *d.* Fly 1872 *by* Chichester.

38 II. (£10.)—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, Notts, for **Flitaway**, bay, bred by John Smurthwaite, Sutton, Retford, Notts; *s.* Havoc.

37 III. (£5.)—COLONEL M. A. SWINFEN-BROUN, Swinfen Hall, Lichfield, Staffs, for **Swinfen Sunbeam**, chestnut, bred by Samuel Perry, Bank House, Shavington, Market Drayton; *s.* Withernam.

Class 9.—*Hunter Fillies, foaled in* 1900. [2 entries, 1 absent.]

39 I. (£10.)—JOSHUA CLARE, Tennis Court Farm, Hallatrow, Bristol, for **Birdie Bright**, chestnut; *s.* Grand National.

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[1] Prizes given by the Cardiff Local Committee.

[2] Champion Gold Medal, value £10 10*s*., given by the Hunters' Improvement Society for the best Hunter Filly in Classes 7, 8, and 9.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Cleveland Bays and Coach Horses.

Class 10.—*Cleveland Bay or Coaching Stallions, foaled in* 1898. [3 entries.]

41 I. (£15.)—John Lett, Cleveland Stud Farm, Rillington, Yorks, for **Speciality** 1562 C.B.S.B., bay; *s.* Merryheart 1299, *d.* Beatrice 932 *by* Rillington Venture 1114.

42 II. (£10.)—George Scoby, Beadlam Grange, Nawton, Yorks, for **King Fred** 1523 C.B.S B., bay, bred by Alfred Lomas, Langford Hall, Maldon, Essex; *s.* King Frederick the Great 1396, *d.* Queen of Langford 861 *by* Fortunatus 962.

43 **R. N. & H. C.**—F. Wilson-Horsfall, for **King of the East.**

Class 11.—*Cleveland Bay or Coaching Stallions, foaled in* 1899. [8 entries, 2 absent.]

49 I. (£15.)—Frank H. Stericker, Westgate House, Pickering, Yorks, for **Rothbury** 2306, dark bay, bred by Robert Ward, Pinchinthorpe, Guisborough; *s.* Leveret, *d.* Queen *by* Sportsman 2073.

47 II. (£10.)—Henry C. Stephens, Cholderton, Salisbury, Wilts, for **Cholderton Hector** C.B.S.B., bay; *s.* Luck's All 189, *d.* Beauty 5 *by* Prince Frederick 234.

45 III. (£5.)—Thomas Knaggs, Tofts Farm, Marske-by-the-Sea, Yorks, for **Sparrow Hall Favourite** 1561 C.B.S.B., bay, bred by Edward Wood, Sparrow Hall, Kirbymoorside; *s.* Sparrow Hall Venture 1482, *d.* Salton Queen 746 *by* Prince George 235.

48 **R. N. & H. C.**—Henry C. Stephens, for **Cholderton Tertius.**

50 **H C.**—Frank H. Stericker, for **Salford.**

51 **Com.**—F. Wilson-Horsfall, for **Potto Duke.**

Class 12.—*Cleveland Bay or Coaching Mares (with Foals at foot).* [4 entries, none absent.]

52 I. (£15.)—James Finch, Court House, Blean, Canterbury, for **Queen Dearest** 1083 C.B.S.B., bay, foaled 1896 [foal *by* Broomgrove Pride 1364], bred by Alfred Lomas, Langford Hall, Maldon, Essex; *s.* Sultan 667, *d.* Horsfall's Darby *by* Fidius Dius 107.

53 II. (£10.)—George Scoby, Beadlam Grange, Nawton, Yorks, for **The Lady** 831 Y.C.H.S.B., bay, foaled 1897 [foal *by* Sir Dalby 2258], bred by John Rudsdale, Ainthorpe, Danby, Grosmont; *s.* Prince George 367, *d.* *by* Prodigy 2067.

55 III. (£5.)—F. Wilson-Horsfall, Potto Grange, Northallerton, Yorks, for **Lady Salton** 1068 C.B S.B., bay, foaled 1896 [foal *by* Broomgrove Pride 1364], bred by H. C. Stephens, Cholderton, Salisbury; *s.* Luck's All 189, *d.* Countess of Salton 315 *by* Fidius Dius 107.

Hackneys.

Class 13.—*Hackney Stallions, foaled in* 1893, 15 *hands* 1 *inch and upwards.* [7 entries, 1 absent.]

58 I. (£15, & Champion.[1])—Sir Walter Gilbey, Bt., Elsenham Hall, Essex, for **Bonny Danegelt** 6990, chestnut; *s.* Royal Danegelt 5785, *d.* Lady Dorothy 185 *by* Denmark 177.

59 II. (£10.)—John Lett, Cleveland Stud Farm, Rillington, York, for **Rillington Grandee** 7581, bay; *s.* Rosador 4964, *d.* Firefly 3806 *by* Fireaway.

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[1] Champion Gold Medal given by the Hackney Horse Society for the best Hackney Stallion in Classes 13–16.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

56 III. (£5.)—COCKAYNE BROS , Hackney Stud Farm, Sheffield Lane Paddocks, Sheffield, for **Paddock Rufus** 7209, chestnut, bred by J. H. Bryars, Blonk Street, Sheffield; *s.* Polonius 4931, *d.* Paddock Bell 7219 *by* Rufus 1343.

60 R. N. & H. C.—HARRY LIVESEY, Rotherfield, Sussex, for **Dissenter** 7044.

57 Com.—HERBERT B. CORY, for **Copalder Squire.**

Class 14.—*Hackney Stallions, foaled in* 1897 *or* 1898, *above* 14 *hands and under* 15 *hands* 1 *inch.*[1] [4 entries, 1 absent.]

66 I. (£15.)—JOHN MAKEAGUE, Golborne Park, Newton-le-Willows, Lancs, for **The Autocrat** 7294, brown, foaled 1897, bred by J. M. Mitchelsen, The Hall, Pickering, Yorks; *s.* Garton Duke of Connaught 3009, *d.* Ruby 7371 *by* Freeman 2072.

63 R. N. & Com.—COCKAYNE BROS., for **Paddock Polonius.**

Class 15.—*Hackney Stallions, foaled in* 1899. [4 entries, none absent.]

70 I. (£15, & R. N. for Champion.[2])—FREDERICK WRENCH, Killacoona, Ballybrack, co. Dublin, for **Fitz Rose** 7444, chestnut; *s.* Royal Danegelt 5785, *d.* Moss Rose 9355 *by* Chocolate Junior 4185.

69 II. (£10.)—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for **Merry Denmark** 7554, bay; *s.* Royal Danegelt 5785, *d.* Lily of the Valley 742 *by* Denmark 177.

68 R. N.—HERBERT B. CORY, Druidstone, Castleton, Cardiff, for **St. Athan.**

Class 16.—*Hackney Stallions, foaled in* 1900. [6 entries, 1 absent.]

75 I. (£15.)—H. V. SHERINGHAM, South Creake, Fakenham, Norfolk, for **Creake Matchless,** chestnut; *s.* Moncreiffe Emperor 5726, *d.* Maidie 11241 *by* Silvio 4983.

73 II. (£10.)—W. R. LYSAGHT, Dennel Hill, Chepstow, for **Pendragon,** chestnut; *s.* Polonius 4931, *d.* Maudess 3045 *by* Hue and Cry Shales 379.

76 R. N.—CAPT. E. M. WHITTING, Totterdown, Weston-super-Mare, for **Bobs.**

Class 17.—*Hackney Mares (with Foals at foot),* 15 *hands and upwards.* [7 entries, 1 absent.]

79 I. (£15, & Champion.[3])—HARRY LIVESEY, Rotherfield, Sussex, for **Orange Blossom** 5957, chestnut, foaled 1891 [foal *by* McKinley 6475], bred by Wm. Baxter, Burton Pidsea, Hull; *s.* Connaught 1453, *d.* Orange Girl 2nd 8347 *by* General Gordon 2084.

80 II. (£10.)—HARRY LIVESEY, for **Surprise** 3299, chestnut, foaled 1889 [foal *by* McKinley 6475], bred by W. Waterhouse, Starborough Stud Farm, Edenbridge; *s.* Ritualist 1542, *d.* Brunette 49 *by* Lord Derby 2nd 417.

83 III. (£5.)—JAMES YATES, Bilton Hall, York, for **Ada Rufus** 4955, chestnut, foaled 1891 [foal *by* Ganymede 2076], bred by John Atkinson, High Field House, Garton, York; *s.* Rufus 1343, *d.* Amelia 1423 *by* Danegelt 174.

82 R. N. & H. C.—R. T. THORNTON, for **Clairvoyante.**

81 Com.—WILLIAM OPPENHEIMER, for **Lady Cranbrook.**

Class 18.—*Hackney Mares (with Foals at foot), above* 14 *hands and under* 15 *hands.*[1] [3 entries, 1 absent.]

85 I. (£15.)—R. T. THORNTON, Middleton Hall, Brentwood, Essex, for **Princess May** 12230, bay, foaled 1897 [foal *by* Rosador 4964], bred by His Majesty the King, Sandringham, Norfolk; *s.* Field Marshal 2986, *d.* New York 1296 *by* Reality 665.

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[1] Prizes given by the Cardiff Local Committee.

[2] Champion Gold Medal given by the Hackney Horse Society for the best Hackney Stallion in Classes 13-16.

[3] Champion Gold Medal given by the Hackney Horse Society for the best Hackney Mare or Filly in Classes 17-20.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

84 II. (£10.)—C. V. HAWORTH, Thornton Lodge, Poulton-le-Fylde, for **Ringlet** 3232, bay, foaled 1888 [foal *by* Lord Ramsdale 6460], bred by T. Blanshard, Goxhill House, Seaton, Hull; *s.* Danegelt 174, *d.* Peg *by* Fireaway 4th 2989.

Class 19.—*Hackney Fillies, foaled in* 1898. [3 entries, 1 absent.]

88 I. (£15, & R. N. for Champion[1])—JOHN MAKEAGUE, Golborne Park, Newton-le-Willows, Lancs, for **Hermione** 12704, chestnut; *s.* Chocolate Junior 4185, *d.* Primrose Dame 7282 *by* Candidate 920.

89 R. N. & H. C.—R. T. THORNTON, Middleton Hall, Brentwood, for **Tricksey.**

Class 20.—*Hackney Fillies, foaled in* 1899. [2 entries.]

90 I. (£15.)—ROBERT HUSSEY, Eastfields, Lichfield, Staffs, for **Puzzle** 13857, chestnut, bred by George M. Gale, Atwick Hall, Hull; *s.* Atwick Surprise 5092, *d.* Lady Isabel 1638 *by* Danegelt 174.

91 R. N. & H. C.—ROBERT WILLIAM JAY, for **Knowle Halma.**

Class 21.—*Hackney Mares or Geldings, foaled in* 1895, 1896, *or* 1897, *to carry* 15 *stone and upwards.*[2] [5 entries, 3 absent.]

92 I. (£15.)—FRANK J. BATCHELOR, Hopwood Stud Farm, Alvechurch, Worcs., for **Wild Agnes** 10612, chestnut mare, foaled 1895, bred by John Robinson, Hedon, Hull; *s.* Master of Ballantrae 4403, *d.* Edith 5255 *by* Topper (late Sir Walter) 1350.

96 R. N.—A. D. OATES, Ryburn Stud, Halifax, Yorks, for **Ryburn Swell.**

Class 22.—*Hackney Mares or Geldings, foaled in* 1895, 1896, *or* 1897, *to carry* 12 *stone and under* 15 *stone.*[2] [3 entries, 2 absent.]

99 I. (£15.)—E. JONES, Manoravon, Llandilo, Carmarthenshire, for **Lady Athol** 11052, bay mare, foaled 1896, bred by Robert Kerrison, North Elmham, East Dereham, Norfolk; *s.* Athol Lad 4615, *d.* Magnet No. 657 Inspected F.S. *by* Washington 852.

Ponies.

Class 23.—*Pony Stallions, not exceeding* 14 *hands.* [5 entries, none absent.]

100 I. (£15.)—EDGAR BAXTER, Hutton Stud, Brentwood, Essex, for **Dandy Ribbons** 7419, bay, foaled 1897, bred by T. Banyard Colman, The Mills, East Harling; *s.* Protection 4th 5762, *d.* Junia 6812 *by* Cassius 2397.

102 II. (£10.)—A. D. OATES, Ryburn Stud, Halifax, Yorks, for **Ryburn Masher** 7256, bay, foaled 1898, bred by Walter H. Oates, Ryburn Stud, Halifax, Yorks; *s.* Sir Horace 5402, *d.* Tiddy Fol Lol 13147 *by* Pick Up 1087.

103 R. N.—G. WEBBER, 48 Walker Rd., Cardiff, for **Prince Young Lion Express.**

Class 24.—*Pony Mares (with Foals at foot), not exceeding* 14 *hands.* [3 entries, 1 absent.]

106 I. (£15.)—E. JONES, Manoravon, Llandilo, Carmarthenshire, for **Megania,** roan, foaled 1896; *s.* King Flyer 5247, *d.* Megan 1010 Inspected F.S.

107 II. (£10.)—HERBERT T. PARKE, Withnell Fold, Chorley, for **Handy Jane** 10999, grey, foaled 1891 [foal *by* Sir Horace 5402], bred by A. E. Grice, Ganton, York; *s.* Freeman 2072, *d. by* Lord Derby 2nd 417.

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[1] Champion Gold Medal given by the Hackney Horse Society for the best Hackney Mare or Filly in Classes 17 to 20.

[2] Prizes given by the Cardiff Local Committee.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 25.—*Pony Mares or Geldings, above* 13 *hands* 2 *inches, and not exceeding* 14 *hands* 2 *inches.*[1] [9 entries, 3 absent.]

115 I. (£10.)—E. SMITH, Benton House, Newcastle-on-Tyne, for **Wild Lucy** 11573, brown mare, foaled 1895, bred by P. & T. Deighton, North Duffield, Selby; *s.* Wildfire 1224, *d.* Lucy Bother 'em 3015 *by* Danegelt 174.

116 II. (£5.)—W. J. TATEM, Shandon, Penylan, Cardiff, for **Lord Towyvale**, brown gelding, foaled 1895, bred by E. Jones, Manoravon, Llandilo; *s.* Confidant 936, *d.* Old Fashion No. 1665 Inspected F.S.

113 III. (£3.)—C. RADCLIFFE, 23 Dumfries Place, Cardiff, for **Princess Royal** 10442, chestnut mare, foaled 1895, bred by G. Johnson, South Gate, Market Weighton; *s.* His Majesty 2513, *d.* Silver Queen 9516 *by* Danegelt 174.

112 **R. N.**—HERBERT T. PARKE, Withnell Fold, Chorley, Lancs, for **Cassius.**

Class 26.—*Pony Mares or Geldings, under* 13 *hands* 2 *inches.*[1] [4 entries, none absent.]

118 I. (£10.)—G. E. FRANKLIN, The Field, Derby, for **Lady Go-bang**, chestnut mare, foaled 1896, bred by William Williams, Plas Cilcenia, Celian Aeron; *s.* Eiddwen Flyer 2053, *d. by* Welsh Flyer 856.

119 II. (£5.)—ISAAC C. GLOVER, Warrenhurst, Blundellsands, Liverpool, for **Lady Magnet**, bay mare, foaled 1894.

120 **R. N.**—E. JONES, Manoravon, Llandilo, for **Bit of Fashion.**

Shetland Ponies.

Class 27.—*Shetland Pony Stallions, not exceeding* 10½ *hands, foaled before or in* 1898.[2] [5 entries, none absent.]

123 I. (£5.)—R. W. R. MACKENZIE, Earlshall, Leuchars, Fifeshire, for **Rattler** 210, brown, foaled 1895, bred by Gavin Hadden, Dalmuinzie, Murtle, Aberdeenshire; *s.* Multum in Parvo 28, *d.* Moonlight 469 *by* Giant 10.

121 II. (£3.)—THE LADIES E. and D. HOPE, Great Hollenden Farm, Sevenoaks, for **Oman** 33, brown, foaled 1885, bred by the Marquis of Londonderry, K.G.,; *s.* Prince of Thule 36, *d.* Norna 198 *by* Lord of the Isles 26.

124 III. (£2.)—THE SEAHAM HARBOUR STUD, LTD., Seaham Harbour, co. Durham, for **Jupiter**, black, foaled 1897, bred by the Marquis of Londonderry, K.G.,; *s.* Odin 32, *d.* Jewel 1195 *by* Lord of the Isles 26.

122 **R. N. & H. C.**—MRS. WENTWORTH HOPE JOHNSTONE, for **Very Good.**

Class 28.—*Shetland Pony Mares, not exceeding* 10½ *hands, foaled before or in* 1898.[2] [5 entries, 1 absent.]

129 I. (£5.)—MRS. WENTWORTH HOPE JOHNSTONE, Skeynes, Edenbridge, Kent, for **Emerald** 1275, mouse colour, foaled 1893, bred by the Marquis of Londonderry, K.G.; *s.* Odin 32, *d.* Eppie 180 *by* Jack 16.

128 II. (£3.)—THE LADIES E. and D. HOPE, Great Hollenden Farm, Sevenoaks, for **Vementry 2nd** 1104, brown, foaled 1892, bred by the Marquis of Londonderry, K.G.; *s.* Lord of the Isles 26, *d.* Vesta 215 *by* Prince of Thule 36.

126 **R. N.**—THE LADIES E. and D. HOPE, for **Bretta.**

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[1] Prizes given by the Cardiff Local Committee.

[2] Prizes given by the Shetland Pony Stud Book Society.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Mountain and Moorland Ponies.

Class 29.—*Mountain or Moorland Pony Stallions, foaled before or in* 1898, *not exceeding* 13 *hands* 2 *inches.* [2 entries.]

132 **I.** (£10.)—R. W. R. Mackenzie, Earlshall, Leuchars, Fifeshire, for **Mansfield**, bay, foaled 1898; *s.* Bloomfield, *d.* Mayflower.

131 **R. N.**—John Jones & Son, for **Silver Eye.**

Class 30.—*Mountain or Moorland Pony Mares, foaled before or in* 1898, *not exceeding* 13 *hands* 2 *inches.* [3 entries, none absent.]

133 **I.** (£10.)—John Jones & Son, Dinarth Hall Pony Stud, Colwyn Bay, Denbighshire, for **Lady Jones**, black, foaled 1894, bred by J. Lloyd, Pantpostiog, Llanidloes, Mont.; *s.* Eiddwen Flyer 2053, *d.* Old Gwen.

Welsh Mountain Ponies.

Class 31.—*Welsh Mountain Pony Stallions, foaled before or in* 1898, *not exceeding* 13 *hands.*[1] [6 entries, none absent.]

136 **I.** (£10, **& Champion.**[2])—H. Meuric Lloyd, Glanyrannell, Llanwrda, Carmarthenshire, for **Starlight** 167, grey, foaled 1894; *s.* Glassallt, *d.* Moonlight 908.

138 **II.** (£5.)—Tom Parry and E. Jones, Nenadd, Cross Inn, R.S.O., Llandyssul, South Wales, for **Eiddwen Flyer 3rd**, blue roan, foaled 1896, bred by Benjamin Thomas, Wernfaith, Pencarreg, Llanybyther; *s.* Eiddwen Flyer 2nd, *d.* Welsh Mountain Pony *by* Cymro Llwyd.

141 **R. N.**—F. Thomas, Commercial Pony Stud, Narberth, Wales, for **Jabbo.**

137 **Com.**—The Duchess of Newcastle, for **Hardwick Briton.**

Class 32.—*Welsh Mountain Pony Mares, foaled before or in* 1898, *not exceeding* 13 *hands.*[1] [12 entries, 1 absent.]

152 **I.** (£10, **& R. N. for Champion.**[2])—The Duchess of Newcastle, Clumber, Worksop, for **Lady White**, white, foaled 1890.

147 **II.** (£5.)—J. D. Lewis, Greenway, Narberth, Pembrokeshire, for **Polly**, chestnut, foaled 1898.

149 **R. N. & H. C.**— H. Meuric Lloyd, for **Spot o' Luck.**

H. C.—John Jones & Son, for No. 143, **Queen Bee**, and No. 144, **Titw.**

145 **Com.**—John Jones & Son, for **Y Frân Ddu.**

Polo Ponies.

Class 33.—*Polo Pony Stallions, not exceeding* 14 *hands* 2 *inches.*[1] [4 entries, none absent.]

154 **I.** (£15, **& Champion.**[3])—Sir Walter Gilbey, Bt., Elsenham Hall, Essex, for **Rosewater** 37, bay, foaled 1883, bred by A. W. Elphick, Preston Park, Brighton; *s.* Rosicrucian, *d.* Lady Day II. *by* Saint Mungo.

157 **II.** (£10, **& R. N. for Champion.**[3])—G. Norris Midwood, The Hut, Tabley, Knutsford, Cheshire, for **Rudheath** 182, bay, foaled 1893, bred by M. Gurry, Newmarket; *s.* Macheath, *d.* June Rose *by* Saraband.

155 **R. N.**—John Jones & Son, for **Gownboy.**

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[1] Prizes given by the Cardiff Local Committee.

[2] Champion Silver Medal given by the Polo Pony Society for the best Welsh Mountain Pony in Classes 31 and 32.

[3] Champion Gold Medal given by the Polo Pony Society for the best Polo Pony Stallion in Classes 33 and 34.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 34.—*Polo Pony Stallions (Eastern Ponies), not exceeding 14 hands 2 inches.*[1] [2 entries.]

158 **I.** (£10.)—G. NORRIS MIDWOOD, The Hut, Tabley, Knutsford, Cheshire, for **The Bey** 108, bay, foaled 1886, Arab of the Tahowi breed.

159 **II.** (£7.)—THE REV. D. B. MONTEFIORE, Mursley Hall, Winslow, for **Mootrub** 32, chestnut, foaled 1886, bred in Arabia.

Class 35.—*Polo Pony Mares, above* 13 *hands* 2 *inches and not exceeding* 14 *hands* 2 *inches, with foals at foot, or to foal in* 1901.[1] [6 entries, none absent.]

160 **I.** (£10, & **R. N. for Champion.**[2])—JOHN BARKER, The Grange, Bishop's Stortford, Herts, for **Lightning** 726, chestnut, aged [with filly foal *by* Rosewater 37].

162 **II.** (£7.)—THE KEYNSHAM STUD CO., The Lodge Stud Farm, Keynsham, Som., for **First Flight** 615, brown, foaled 1888 [colt foal *by* Birmingham Royal 127], bred by S. Bennett, Says Farm, Coalpit Heath, Glos.; *s.* Balqudahar, *d.* Polly 562.

161 **III.** (£3.)—JOHN BARKER, Bishop's Stortford, for **Serf Belle** 504, bay, foaled 1894 [in foal to Rosewater 37], bred by F. J. Grainger, Thornholme, Burton Agnes, Hull; *s.* Southampton, *d.* Gazelle *by* King of the Forest.

164 **R. N. & Com.**—THE REV. D. B. MONTEFIORE, for **Girton Girl.**

Class 36.—*Polo Pony Mares, not exceeding* 13 *hands* 2 *inches, with foals at foot, or to foal in* 1901.[1] [5 entries, 1 absent.]

170 **I.** (£10, & **Champion.**[2])—THE REV. D. B. MONTEFIORE, Mursley Hall, Winslow, Bucks, for **Zither** 473, chestnut, foaled 1883 [foal *by* Mootrub 32], bred in Ireland; *s.* Marlbrouck, *d.* La Harpe.

166 **II.** (£7.)—JOHN BARKER, The Grange, Bishop's Stortford, Herts, for **Jeanie** 630, chestnut, aged [in foal to Sandiway 121].

169 **R. N. & Com.**—G. NORRIS MIDWOOD, for **Sweetbriar.**

Class 37.—*Polo Pony Colts, Geldings, or Fillies, foaled in* 1898, *not exceeding* 14 *hands* 1 *inch.*[1] [5 entries, 1 absent.]

173 **I.** (£7.)—G. NORRIS MIDWOOD, The Hut, Tabley, Knutsford, Cheshire, for **Fabiana**, bay filly, bred by R. C. Vyner, Newby Hall, Ripon, Yorks; *s.* Minting, *d.* Fabia *by* Underhand.

171 **II.** (£4.)—THE KEYNSHAM STUD CO., The Lodge Stud Farm, Keynsham, Som., for **Maidstone Royal** 136, chestnut gelding, bred by Stuart Forster, Postlip Hall, Winchcomb, Glos.; *s.* Mootrub 32, *d.* Sally 668.

174 **R. N.**—SIR H. F. DE TRAFFORD, BT., for **Bobby.**

Class 38.—*Polo Pony Colts, Geldings, or Fillies, foaled in* 1899, *not exceeding* 14 *hands.*[1] [9 entries, none absent.]

177 **I.** (£7.)—JOHN BARKER, The Grange, Bishop's Stortford, for **Silversand** 1021, bay filly; *s.* Sandiway 121, *d.* Silvertail 578 *by* Low-Water.

182 **II.** (£4.)—G. NORRIS MIDWOOD, The Hut, Tabley, Knutsford, for **Standard**, black gelding, bred by J. H. Stock, M.P., The White Hall, Tarporley; *s.* Sentinel 78, *d.* Miss Molly 408.

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[1] Prizes given by the Polo Pony Society.

[2] Champion Gold Medal given by the Polo Pony Society for the best Polo Pony Mare in Classes 35 and 36.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

176 **III.** (£2.)—JOHN BARKER, Bishop's Stortford, for **Baby Girl** 924, bay filly; *s.* Sandiway 121, *d.* Portia 660 *by* Special Pleader.

179 **R. N. & Com.**—THE KEYNSHAM STUD CO., for **White Mask.**

Class 39.—*Polo Pony Colts, Geldings, or Fillies, foaled in* 1900.[1] [8 entries, none absent.]

191 **I.** (£7.)—SIR H. F. DE TRAFFORD, BT., Hill Crest, Market Harborough, for **Doubtful** 939, bay filly; *s.* Eheu, *d.* Confidential 934 *by* Rosewater 37.

192 **II.** (£4.)—SIR H. F. DE TRAFFORD, BT., for **Rosebud** 181, bay colt; *s.* Eheu, *d.* Eau-de-Rose 942 *by* Rosewater 37.

187 **III.** (£2.)—JOHN BARKER, The Grange, Bishop's Stortford, for **Wild Duck**, bay filly; *s.* Sandiway 121, *d.* Hill Duck 626 *by* Grey Drake.

186 **R. N. & H. C.**—JOHN BARKER, for **Rose Bud.**

185 **H. C.**—JOHN BARKER, for **Redsand.**

Harness Horses and Ponies.

Class 40.—*Harness Mares or Geldings, of any age, above* 15 *hands* 2 *inches.*[2] [5 entries, 3 absent.]

195 **I.** (£15.)—T. NICHOLAS, Port Talbot, Glamorgan, for **Royal Duck** 11450, chestnut mare, foaled 1896, bred by A. E. W. Darby, Little Ness, Shrewsbury; *s.* His Majesty 2513, *d.* Widgeon 2507 *by* Denmark 177.

197 **R. N. & H. C.**—R. T. THORNTON, for **Duke of Cranbrook.**

Class 41.—*Harness Mares or Geldings, of any age, above* 15 *hands and not exceeding* 15 *hands* 2 *inches.*[2] [5 entries, 4 absent.]

200 **II.** (£10.)—D. T. LEWIS, Blaencilgord, Narberth, Pembrokeshire, for **Lady Lisle**, bay mare, foaled 1898, bred by David James, Blaencilgord Farm, Narberth; *s.* Comet Buck, *d.* Welsh Cob.

Class 42.—*Harness Mares or Geldings, of any age, above* 14 *and not exceeding* 15 *hands.*[2] [13 entries, 4 absent.]

208 **I.** (£15.)—F. LEIGH, Cheriton, Westbury-on-Trym, for **Phœbe Watton** 10414, chestnut mare, foaled 1895, bred by J. W. Temple, Leyswood, Groombridge; *s.* Doncaster 2949, *d.* Phillippine Watton 5986 *by* Candidate.

213 **II.** (£10.)—W. J. TATEM, Shandon, Penylan, Cardiff, for **Taffina**, brown mare, foaled 1894, bred by David Jenkins, Pembroke House, Morriston, R.S.O., Glamorganshire; *s.* Confidant 936, *d.* Violet No. 1734 Inspected F.S.

209 **III.** (£5.)—JAMES MITCHELL, Bryntirion, Hereford, for **Norbury Lincoln**, bay gelding, foaled 1894, bred by Charles Fowler, Lincoln; *s.* Garton Duke of Connaught 3009, *d.* Maid Marion 751 *by* Lord Derby 2nd 417.

211 **R. N. & H. C.**—H. T. PARKE, Withnell Fold, Chorley, for **Lady Love.**
Com.—DR. GEORGE PHILIP FRANCIS, for No. 206, **Royalty**; R. T. THORNTON, for No. 214, **Ready Money.**

Class 43.—*Harness Pony Mares or Geldings, of any age, not exceeding* 14 *hands.*[2] [5 entries.]

216 **I.** (£15.)—WM. FOSTER, Mel-Valley, Moseley, Worcs., for **Lady Horace** 11987, bay mare, foaled 1897, bred by A. W. Hickling, Adbolton, Nottingham; *s.* Sir Horace 5402, *d.* Gordon Belle 8950 *by* General Gordon 2084.

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[1] Prizes given by the Polo Pony Society.
[2] Prizes given by the Cardiff Local Committee

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

217 II. (£10.)—G. E. FRANKLIN, The Field, Derby, for **Lord Gobang**, bay gelding, foaled 1892, bred by C. Manning, Northampton; *s.* Fashion, *d.* Welsh Mare.

220 III. (£5.)—BOWEN P. WOOSNAM, Woodfield, Pembroke, for **Sunbeam**, bay mare, foaled 1895, bred by Wm. Wall, Deer Park, Tenby; *s.* Flying Peter, *d.* Welsh Pony.

218 **R. N. & H. C.**—ISAAC C. GLOVER, for **Balmain Empress.**

219 **Com.**—WILLIAM J. WILLMITT & RICHARD J. DARE, for **Little Queen.**

Shires.

Class 44.—*Shire Stallions, foaled in* 1898. [11 entries, 2 absent.]

228 **I. (£20, & Champion.[1])**—W. & J. THOMPSON, Barron's Park Stud, Desford, Leicester, for **Desford Combination** 17934, brown; *s.* Stonewall 15375, *d.* Hindlip Bonny Girl 18331 *by* Hitchin Conqueror 4458.

230 **II. (£10, & R. N. for Champion.[1])**—THE DUKE OF WESTMINSTER, Eaton Hall, Chester, for **Phenomenon 3rd** 18272, bay, bred by Peter Allen, Willaston Hall, Chester; *s.* Seldom Seen 15348, *d.* Pratt's Violet 18748 *by* Measham Chief 6124.

226 **III. (£5.)**—P. ALBERT MUNTZ, M.P., Dunsmore, Rugby, for **Watnall Victor** 18437, brown, bred by R. G. Hanson, Watnall, Notts; *s.* Royal Rock 14837, *d.* Watnall Patch 19080 *by* Marmion 2nd 9885.

225 **R. N. & H. C.**—P. ALBERT MUNTZ, M.P., for **Dunsmore John o' Gaunt.**

223 **H. C.**—JOHN LEWIS, for **Sweldon King.**

Com.—HIS MAJESTY THE KING, for No. 221, **Benedick**; JAMES HAWKINS, for No. 222, **Kewstoke Harold.**

Class 45.—*Shire Stallions, foaled in* 1899. [6 entries, 3 absent.]

232 **I. (£20.)**—J. P. CROSS, Catthorpe Towers, Rugby, for **Lockinge Forest King** 18867, bay, bred by the late Lord Wantage; *s.* Lockinge Manners, 16780, *d.* The Forest Queen 4470 *by* Royal Albert 1885.

234 **II. (£10.)**—EDWARD GREEN, The Moors, Welshpool, for **Peplow Thumper** 19010, bay, bred by W. Adams, Waters Upton, Salop; *s.* Moors Thumper 15241, *d.* Noble Duchess 26580 *by* Nailstone Royal Ensign 14755.

233 **R. N. & H. C.**—W. H. GODDING, for **Savernake Duke.**

Class 46.—*Shire Stallions, foaled in* 1900. [7 entries, 3 absent.]

244 **I. (£15.)**—LORD ROTHSCHILD, Tring Park, Tring, Herts., for **Birdsall Menestrel**, bay, bred by Lord Middleton, Birdsall House, York; *s.* Menestrel 14180, *d.* Birdsall Darling 22925 *by* Northwood 4593.

242 **II. (£10.)**—LORD LLANGATTOCK, The Hendre, Monmouth, for **Hendre Royal Albert**, brown; *s.* Hendre Baronet 16714, *d.* Bottesford Flower Girl 19458 *by* Pantaloon 13430.

238 **III. (£5.)**—HIS MAJESTY THE KING, Sandringham, Norfolk, for **Topsman Blend**, bay; *s.* Calwich Blend 17226, *d.* Viscountess 22650 *by* Calwich Topsman 8959.

239 **R. N. & H. C.**—W. H. GODDING, for **Savernake Victor.**

Class 47.—*Shire Mares (with Foals at foot).* [6 entries, 3 absent.]

245 **I. (£20, & Champion.[2])**—FRED CRISP, Girton Stud Farm, Cambridge, for **Southgate Charm** 24797, brown, foaled 1896 [foal *by* Mormaer of Batsford 15242]; *s.* Harold 3703, *d.* Southgate Firelight 18902 *by* Vulcan 4145.

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[1] Champion Gold Medal given by the Shire Horse Society for the best Shire Stallion in Classes 44–46, and Prize of £5 as breeders of the Champion Shire Stallion.

[2] Champion Gold Medal given by the Shire Horse Society for the best Shire Mare or Filly in Classes 47–50, and Prize of £5 as breeder of the Champion Shire Mare or Filly.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

249 II. (£10.)—Lord Rothschild, Tring Park, Tring, Herts, for **Windley Blossom** 21178, brown, foaled 1893 [foal *by* Hertfordshire Lad 18800], bred by W. E. Burrows, Windley Hall, Derby; *s.* Marmion 2nd 9885, *d.* Choice 6044 *by* Charter 2740.

248 III. (£5.)—John Lewis, Trwstllewelyn, Garthmyl, Mont., for **Countess** 21543, brown, foaled 1892 [foal *by* Markeaton Royal Harold 15225], bred by John Beavan, Graig, Knighton, Radnorshire; *s.* King of the Princes 11721, *d.* Virgin 2881 *by* A 1 (3).

Class 48.—*Shire Fillies, foaled in* 1898. [7 entries, 1 absent.]

253 I. (£15.)—Sir Walter Gilbey, Bt., Elsenham Hall, Essex, for **Fenland Lady** 28560, bay, bred by G. L. Morris, Thorney, Peterborough; *s.* Blythwood Conqueror 14997, *d.* Fenland Countess 23694 *by* Dunsmore Willington Boy 13021.

254 II. (£10.)—Wm. Jackson, The Hall, Knottingley, for **Holker R. I.** 28930, brown, bred by Victor Cavendish, M.P., Holker Hall, Carnforth; *s.* Markeaton Royal Harold 15225, *d.* Saxon Empress 24685 *by* Harold 3703.

251 R. N. & H. C.—Capt. Percy Archer Clive, M.P., for **Wilcott Bonnie.**

Class 49.—*Shire Fillies, foaled in* 1899. [12 entries, 6 absent.]

259 I. (£15, & R. N. for Champion.[1])—Earl Egerton of Tatton, Tatton Park, Cheshire, for **Lockinge Athena** 32920, brown, bred by the late Lord Wantage; *s.* Prince William 3956, *d.* Dunsmore Gipsy 21707 *by* Dunsmore Masterman 12874.

263 II. (£10.)—R. W. Hudson, Danesfield, Great Marlow, Bucks, for **Wern Blossom** 34420, bay, bred by T. Gittins, Wern, Pool Quay, Welshpool; *s.* Moors Phenomenon 16833, *d.* Wern Brown 30402 *by* Potentate 12086.

261 III. (£5.)—Edward Green, The Moors, Welshpool, Mont., for **Moors Tip Top** 33181, bay, bred by Edward Sankey, Leighton, Iron Bridge, Salop; *s.* Moors Thumper 15241, *d.* Darby 9764 *by* Esquire 2774.

264 R. N. & H. C.—Wm. Jackson, for **Ladysmith 2nd.**

262 H. C.—Alexander Henderson, M.P., for **Lockinge Harriet.**

Class 50.—*Shire Fillies, foaled in* 1900. [19 entries, 7 absent.]

279 I. (£15.)—Lord Llangattock, The Hendre, Monmouth, for **Hendre Birthright**, bay; *s.* Prince Harold 14228, *d.* Bertha 16103 *by* Albert Edward 5467.

276 II. (£10.)—Wm. Jackson, The Hall, Knottingley, Yorks, for **Hendre Bessie**, chestnut, bred by Lord Llangattock, The Hendre, Monmouth; *s.* Prince Harold 14228, *d.* Tatton Bessie 24945 *by* Ganymede 2nd 5874.

284 III. (£5.)—Lord Rothschild, Tring Park, Herts, for **Active Girl**, bay; *s.* Anchorite 16488, *d.* Saxon Girl 18842 *by* Norman Conqueror 7940.

278 R. N. & H. C.—Edward Jones & Sons, for **Parma Violet.**

H. C.—His Majesty The King, for No. 270, **Grey Duchess**, & No. 271; Alexander Henderson, M.P., for No. 274, **Buscot Lilac**; W. F. S. Humphreys, for No. 275, **Normoor Success.**

Clydesdales.

Class 51.—*Clydesdale Stallions, foaled in* 1898. [3 entries.]

291 I. (£15.)—Herbert Webster, Morton House, Fence Houses, co. Durham, for **Baron's Crown** 10679, bay, bred by W. Hood, Chapleton Borgue, Kirkcudbright; *s.* Baron's Pride 9122, *d.* Sally Walker 11815 *by* Prince Lawrence.

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[1] Champion Gold Medal given by the Shire Horse Society for the best Shire Mare or Filly in Classes 47-50, and Prize of £5 as breeder of the Champion Shire Mare or Filly.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

289 II. (£10.)—LORD ARTHUR CECIL, Orchardmains, Tonbridge, Kent, for **Baron Briton** 10678, bay, bred by David Dunn, Roxburgh Mains, Roxburgh; *s.* Baron's Pride 9122, *d.* Garthland Queen 13413 *by* Lawrence's Heir 6931.

290 III. (£5.)—A. AND W. MONTGOMERY, Netherhall and Banks, Kirkcudbright, for **Baron Macadam** 10977, bay, bred by James McAdam, Craigley, Castle Douglas; *s.* Baron's Pride 9122, *d.* Jess of Craigley 10778 *by* Prince of Airds 4641.

Class 52.—*Clydesdale Stallions, foaled in* 1899. [7 entries, 1 absent.]

295 I. (£15.)—SEAHAM HARBOUR STUD, LTD., Seaham Harbour, for **Silver Cup** 11184, black, bred by the late W. H. Lumsden, Balmedie, Aberdeen; *s.* Baron's Pride 9122, *d.* Balmedie Vesta 13911 *by* Macgregor 1487.

293 II. (£10.)—A. AND W. MONTGOMERY, Netherhall and Banks, Kirkcudbright, for **Montrave Dauntless** 11119, brown, bred by Sir John Gilmour, Bart., Montrave, Leven, Fife; *s.* Macgregor 1487, *d.* Dukina 12486 *by* Prince of Fashion.

292 III. (£5.)—LORD ARTHUR CECIL, Orchardmains, Tonbridge, Kent, for **Sal Volatile**, black; *s.* Palmerston 10389, *d.* Pride of Auchentoshan 12097 *by* Lord Ailsa 5974.

Class 53.—*Clydesdale Mares (with Foals at foot).* [3 entries, none absent.]

300 I. (£15.)—SEAHAM HARBOUR STUD, LTD., Seaham Harbour, co. Durham, for **Selma** 14398, bay, foaled 1896 [foal *by* Lord Stewart 10084], bred by the late Colonel Stirling, Kippendavie, Dunblane; *s.* Sir Everard 5353, *d.* Beatrice 5798 *by* Old Times 579.

301 II. (£10.)—MISS E. C. TALBOT, Margam Park, Port Talbot, Glam., for **Maud**, bay, foaled 1896; *s.* Montrave Major 9623, *d.* Carillon 12675 *by* Claymore 3522.

Class 54—*Clydesdale Fillies, foaled in* 1898. [4 entries.]

303 I. (£15.)—THOMAS SMITH, Blacon Point, Chester, for **Cedric Princess**, brown; *s.* Baron's Pride 9122, *d.* Fickle Fortune Princess 2nd 12879 *by* Cedric 1087.

305 II. (£10.)—HERBERT WEBSTER, Morton House, Fence Houses, co. Durham, for **Lady Florence**, brown, bred by James Picken, Torrs Farm, Kirkcudbright; *s.* Baron's Pride 9122, *d.* Mabel of Torrs 13571 *by* Prince Romeo 8144.

304 **R. N. & H. C.**—THOMAS SMITH, for **Gartly Beauty.**

302 **H. C.**—LORD ARTHUR CECIL, for **Baroness Montague.**

Suffolks.

Class 55.—*Suffolk Stallions, foaled in* 1898. [3 entries.]

306 I. (£15.)—E. A. COOK, Dennington Lodge, Framlingham, for **Ironside** 2759, chestnut; *s.* Border Minstrel 2287, *d.* Duchess 3536 *by* Milo 2042.

308 II. (£10.)—A. H. E. WOOD, Sudbourn Hall, Suffolk, for **Sudbourn King of Trumps** 2794, chestnut, bred by Trustees of late Duke of Hamilton; *s.* Eclipse 2627, *d.* Sudbourn Queen of Trumps 4330 *by* Cupbearer 3rd 566.

307 **R. N. & Com.**—A. J. SMITH, Rendlesham, Woodbridge, for **Sydney.**

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 56.—*Suffolk Stallions, foaled in* 1899. [6 entries, 1 absent.]

314 I. (£15.)—A. H. E. Wood, Sudbourn Hall, Suffolk, for **Sudbourn Count** 2837, chestnut; *s.* Prince Wedgewood 2364, *d.* Cuss 4375 *by* Champion 1510.

311 II. (£10.)—Alfred J. Smith, Rendlesham, Woodbridge, Suffolk, for **Rendlesham Lord Grey** 2847, chestnut, bred by William Gray, Parham Hall, Wickham Market; *s.* Prince Wedgewood 2364, *d.* Mignonette 3565 *by* Saunterer 1716.

310 **R. N. & H. C.**—Sir W. Cuthbert Quilter, Bt., M.P., for **Bawdsey Raider.**

Class 57.—*Suffolk Mares (with Foals at foot).* [4 entries, 1 absent.]

316 I. (£15.)—Sir W. Cuthbert Quilter, Bt., M.P., Bawdsey Manor, Woodbridge, Suffolk, for **The Lady** 3297, chestnut, foaled 1892 [foal *by* Prince Wedgewood 2364], bred by H. Wolton, Newbourn Hall, Woodbridge; *s.* Warrior 1938, *d.* Diadem's Empress 1977 *by* Diadem 1553.

315 II. (£10.)—Sir W. Cuthbert Quilter, Bt., M.P., for **Court Pride** 4108, chestnut, foaled 1895 [foal *by* Prince Wedgewood 2364], bred by Henry Turner, Mickfield Hall, Stowmarket; *s.* Sudbourne Duke 2080, *d.* Blossom 2440 *by* Punch 898.

Class 58.—*Suffolk Fillies, foaled in* 1898. [6 entries, none absent.]

324 I. (£15.)—A. H. E. Wood, Sudbourn Hall, Suffolk, for **Sudbourn Trinket** 4412, chestnut, bred by W. Durrant, Butley, Suffolk; *s.* Eclipse 2627, *d.* Topsy 4323 *by* Cupbearer 3rd 566.

322 II. (£10.)—Sir W. Cuthbert Quilter, Bt., M.P., Bawdsey Manor, Suffolk, for **Courage** 4295, chestnut, bred by Robert Edgar, Cockfield, Suffolk; *s.* Conquest 2292, *d.* Cockfield Choice 3341 *by* Rattle 1776.

321 **R. N. & H. C**—Sir W. Cuthbert Quilter, Bt., M. P., for **Bawdsey China Doll.**

Com.— Edward F. Quilter, for No. 319, **Bentley Girl,** and No. 320, **Bentley Gladys.**

Colliery Horses, and Draught Horses of any Breed (in Harness).

Class 59.—*Colliery Mares or Geldings, of any age, above* 14 *hands* 2 *inches and not exceeding* 15 *hands* 2 *inches, suitable for underground work.*[1] [13 entries, none absent.]

325 I. (£10.)—George Alden, Heathcock Hotel, Llandaff, Glam., for **Ball,** bay mare, foaled 1895.

329 II. (£5.)—William Evans, Gwempa Farm, Pontantwn, Kidwelly, Carmarthenshire, for **Madame,** bay mare, foaled 1899; *s.* Active Lad 2nd 17104, *d.* Flower *by* Blagdon Bang Up 4875.

335 III. (£3.)—John Miles, Tydu Farm, St. Fagans, Cardiff, for **Chance,** bay mare, foaled 1893; *s.* Field Marshal, *d.* Diamond.

327 **R. N. & H. C.**—Samuel Evans, for **Prince,** and **H. C.** for No. 328, **Darby.**

Com.—Locket's Merthyr Collieries (1894) Ltd., for No. 332, **Blücher,** and No. 333, **Osman;** Arthur M. Maddock, for No. 334, **Derby;** Rowland Thomas, for No. 337, **Victoria.**

Class 60.—*Colliery Mares or Geldings, of any age, not exceeding* 14 *hands* 2 *inches, suitable for underground work.*[1] [No entries.]

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[1] Prizes given by the Cardiff Local Committee.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 61.—*Cart Mares or Geldings, foaled in* 1897.[1] [4 entries.]

339 I. (£10.)—TIMOTHY LOWE, The Oaklands, Walton, Burton-on-Trent, for **Thumper**, bay gelding, bred by James E. Jennings, Whittingham, Preston; *s.* Moulton Gay Lad 11894, *d. by* Rufford Champion 3996.
340 II. (£5.)—EDWARD THOMAS & SON, 315 Cowbridge Road, Canton, Cardiff, for **Captain**, bay gelding, bred by Mrs. Thomas, Cog Farm, Sully, Cardiff; *s.* Cannock Garfield 12883.
338 III. (£3.)—R. S. DAVID, Wilton Farm, Cowbridge, Glam., for **May Flower**, bay mare; *s.* Montrave Major 9623, *d.* Bright.

341 **R. N. & H. C.**—G. H. WILLIAMS, for **Glamorgan Fashion.**

Class 62.—*Cart Mares or Geldings, foaled in* 1898.[1] [4 entries, 1 absent.]

345 I. (£10.)—W. M. WOOD, Purston Hall, Pontefract, for **The Fox**, bay gelding, bred by Joseph Threlkeld, Wampool, Cumberland; *s.* Lord Lothian 5998.
343 II. (£5.)—SARAH LOVELUCK & SON, Kenfig House, Pyle, Bridgend, Glam., for **Prince**, brown gelding; *s.* Montrave Major 9623, *d.* Diamond.

344 **R. N.**—EDWIN MORGAN, Ystradberwig Isaf, Pontypridd, for **Belle.**

Class 63.—*Draught Horses, Mares, or Geldings, suitable for a Builder, Brewer, Timber Merchant, Tradesman, Haulier, Railway or Corporation.*[1] [10 entries, 1 absent.]

350 I. (£10.)—CORKER AND BEVAN, Victoria Road, Swansea, for **Hulton Laddie**, bay gelding, foaled 1895.
351 II. (£5.)—CORKER AND BEVAN, for **Roger**, bay gelding, foaled 1896.
352 III. (£3.)—EXECUTORS OF THE LATE JOHN MOON, Hope Street, Cardiff, for **Heath Primrose** 20069, bay mare, foaled 1894, bred by Stewards of the Jockey Club, Newmarket; *s.* Mars Victor 9889, *d.* Witham Bounty 5582 *by* Warrior 2689.

346 **R. N. & H. C.**—JOHN BLAND & CO., LTD., Cardiff, for **Duke.**
H. C.— EXECUTORS OF THE LATE JOHN MOON, for No. 353, **Bowler**; EDWARD THOMAS & SON, for No. 354, **Prince.**

CATTLE.

Shorthorns.

Class 64.—*Shorthorn Bulls, calved in* 1897 *or* 1898. [11 entries, 1 absent.]

356 I. (£15, & Champion.[2])—HIS MAJESTY THE KING, Royal Farms, Windsor, for **Royal Duke** 75509, roan, born March 17, 1898, bred by Her late Majesty Queen Victoria; *s.* Prince Victor 73320, *d.* Rosewater *by* Red Rover 63192.
357 II. (£10, & R. N. for Champion.[2])—HIS MAJESTY THE KING, Sandringham, for **Pride of Collynie** 75248, roan, born Feb. 23, 1898, bred by William Duthie, Collynie, Tarves, N.B.; *s.* Pride of Morning 64546, *d.* Lady Lancaster 8th *by* Dauntless 54155.

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[1] Prizes given by the Cardiff Local Committee.

[2] Champion Prize of £20, given by the Shorthorn Society for the best Shorthorn Bull in Classes 64-66.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

360 **III.** (£5.)—G. Harrison, Gainford Hall, Darlington, for **Inspector** 72715, roan, born April 23, 1897, bred by A. Crombie, Woodend, New Machar, N.B.; *s.* Granite City 70570, *d.* Roan Lady *by* Standard Bearer 55096.

359 **R. N. & H. C.**—H. Ker Colville, for **Royal Seal.**

363 **H. C.**—C. Morgan-Richardson, for **Major-General.**

Com.—Thomas Atkinson, for No. 358, **Senator**; J. Deane Willis, for No. 365, **Regulator.**

Class 65.—*Shorthorn Bulls, calved in* 1899. [22 entries, 4 absent.]

369 **I.** (£15.)—William Bell, Ratcheugh, Alnwick, Northumberland, for **Baron Abbotsford** 76087, roan, born Jan. 18; *s.* Baron Alnwick 69918, *d.* Lady Clara 3rd *by* Abbotsford 66588.

384 **II.** (£10.)—Philo L. Mills, Ruddington Hall, Notts, for **Brilliant Star** 76240, red, born April 7, bred by A. M. Gordon, Newton, Insch, N.B.; *s.* Star of Morning 58189, *d.* Bessie *by* Prince of Fashion 64587.

375 **III.** (£5.)—George Harrison, Gainford Hall, Darlington, for **Gainford Rising Star** 76727, roan, born Jan. 16; *s.* Misty Morning 71021, *d.* Rose of Donaghmore *by* Lord Erne 62875.

370 **R. N. & H. C.**—Henry Dudding, for **Ingram's Perfection.**

H. C.—Lord Fitzhardinge, for No. 373, **Lord Inverness**; George Harrison, for No. 374, **Gainford First Favourite**; J. T. Hobbs, for No. 378, **New Year's Gift**; Philo L. Mills, for No. 385, **Magic Stone.**

Com.—J. W. Barnes, for No. 368, **British Flag**; Capt. W. H. O. Duncombe, for No. 372, **Manor Victory**; W. J. Hosken, for No. 380, **Duke of Hayle**; Lord Tredegar, for No. 388, **Prince Alto.**

Class 66.—*Shorthorn Bulls, calved in* 1900. [28 entries, 14 absent.]

397 **I.** (£15.)—George Harrison, Gainford Hall, Darlington, for **Silver Bell**, roan, born Jan. 20, bred by W. Duthie, Collynie, Tarves, N.B.; *s.* Silver Plate 75633, *d.* Bright Belle (vol. xl. p. 357) *by* Leon 49860.

395 **II.** (£10.)—Henry Dudding, Riby Grove, Great Grimsby, for **Victor**, red, born Jan. 5, bred by Lord Lovat, Beaufort Castle, Beauly, N.B.; *s.* Royal Star 71502, *d.* Beaufort Pride (vol. xlii. p. 499) *by* Proud Duke 59713.

393 **III.** (£5.) William Bell, Ratcheugh, Alnwick, for **Baron's Pride**, roan, born Jan. 16; *s.* Baron Alnwick 69918, *d.* Lady Clara 3rd. (vol. xlvi. p. 340) *by* Abbotsford 66588.

406 **R. N. & H. C.**—Philo L. Mills, for **Duke of Hamilton 3rd.**

H. C.—His Majesty The King, for No. 389, **Majestic**; T. F. Roskruge, for No. 409, **Lord Norman**; Lord Tredegar, for No. 413, **Jester.**

Com.—William Bell, for No. 394, **Buttercup's Pride**; William Heaton, for No. 398, **Tommy Atkins**; W. J. Hosken, for No. 400, **Duke of Cornwall.**

Class 67.—*Shorthorn Cows (in-milk), calved in* 1895, 1896, *or* 1897. [8 entries, 3 absent.]

420 **I.** (£15.)—Captain W. H. O. Duncombe, Waresley Park, Hunts, for **Warrior Queen** (vol. xlv. p. 430), roan, born June 13, 1897, calved Nov. 15, 1900; *s.* Liberator 64260, *d.* Amazon *by* Commander 54116.

421 **II.** (£10.)—George Harrison, Gainford Hall, Darlington, for **Welcome** (vol. xlv. p. 490), roan, born Sept. 30, 1895, calved Dec. 11, 1900; *s.* Champion Cup 65240, *d.* Warfare *by* First Consul 57314.

418 **R. N. & H. C.**—C. W. Brierley, for **Autumn Queen.**

424 **H. C.**—Lord Tredegar, for **Queen Mab.**

422 **Com.**—C. W. Kellock, for **Silene.**

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 68.—*Shorthorn Heifers (in-milk), calved in* 1898.
[5 entries, 2 absent.]

429 **I. (£15, & Champion.[1])**—J. DEANE WILLIS, Bapton Manor, Codford St. Mary, Wilts, for **White Heather**, white, born Feb. 1, calved Sept. 27, 1900, bred by J. B. Manson, Kilblean, Aberdeenshire; *s.* Merry Mason 67486, *d.* Beauty 24th (vol. xxxviii. p. 485) *by* Morton 53330.

428 **II. (£10, & R. N. for Champion.[1])**—ALEXANDER HENDERSON, M.P., Buscot Park, Faringdon, Berks, for **Ringdale Favourite 2nd**, roan, born Feb. 11, calved Oct. 15, 1900, bred by J. Thorley, Ringdale House, Faringdon; *s.* Viator 71769, *d.* Favourite 7th *by* Hindlip 34th 54441.

426 **R. N.**—HENRY DUDDING, for **Fairy Belle 8th.**

Class 69.—*Shorthorn Heifers, calved in* 1899. [12 entries, 1 absent.]

432 **I. (£15.)**—HENRY DUDDING, Riby Grove, Gt. Grimsby, for **Floradora**, roan, born May 6, bred by D. Hume, Barrelwell, Brechin, N.B.; *s.* Bruiach 72132, *d.* Flood *by* Violet Chief 66474.

438 **II. (£10.)**—W. J. HOSKEN, Loggans Mill, Hayle, Cornwall, for **Wild Duchess 20th** (vol. xlvi. p. 547), red, born Oct. 4; *s.* Monocrat 67505, *d.* Wild Duchess 11th *by* Duke of Wellington 63923.

431 **III. (£5.)**—JEREMIAH COLMAN, Gatton Park, Surrey, for **Hawthorn Gem 3rd**, roan, born Jan. 7, bred by W. Atkinson, Overthwaite, Milnthorpe; *s.* Cairo 72151, *d.* Hawthorn Gem 2nd (vol. xliv. p. 296) *by* Baron Bloom.

433 **R. N. & H. C.**—HENRY DUDDING, for **Hawthorn Blossom 10th.**

435 **H. C.**—CAPT. W. H. O. DUNCOMBE, for **Ruby Robe.**

Com.—HENRY DUDDING, for No. 434, **Ombersley Bride**; C. H. JOLLIFFE, for No. 439, **Rosy Dawn**; LORD TREDEGAR, for No. 440, **Lassie 3rd.**

Class 70.—*Shorthorn Heifers, calved in* 1900. [18 entries, 7 absent.]

454 **I. (£15.)**—RICHARD STRATTON, The Duffryn, Newport, Mon., for **Calico Belle**, roan, born Feb. 8; *s.* Alto 68147, *d.* Calico (vol. xliii. p. 499) *by* Bapton Star 62107.

443 **II. (£10.)**—HIS MAJESTY THE KING, Royal Farms, Windsor, for **Ruby**, roan, born Jan. 20, bred by Her late Majesty Queen Victoria; *s.* Robin Nonpareil 73433, *d.* Rose Bloom (vol. xlvi. p. 293) *by* Red Rover 63192.

448 **III. (£5.)**—W. J. HOSKEN, Loggans Mill, Hayle, Cornwall, for **Lady Blithfield 12th**, roan, born Jan. 5; *s.* Treforrest 63452, *d.* Lady Blithfield 8th (vol. xliii. p. 498), *by* Duke of Tregunter 10th 54224.

447 **R. N. & H. C.**—SIDNEY HILL, for **Trilby 4th.**

H.C.—D. H. MYTTON, for No. 451, **Delight**; J. D. WILLIS, for No. 458, **Vain Duchess.**

Com.—HENRY DUDDING, for No. 445, **Riby Jessie**; SIDNEY HILL, for No. 446, **Crocus 2nd.**

Lincolnshire Red Short-horns.

N.B.—In Classes 71-74 *the number in brackets after an animal's name indicates that it is entered in Coates's Herd Book. A number without brackets indicates that the animal is registered in the Lincolnshire Red Short-horn Herd Register.*

Class 71.—*Lincolnshire Red Short-horn Bulls, calved in* 1897, 1898, *or* 1899.[2] [6 entries, none absent.]

62 **I. (£15.)**—RICHARD AND ROBERT CHATTERTON, Stenigot, Lincoln, for **Sirdar** 1676, born July 20, 1897, bred by J. B. Hill, Smethwick Hall, Congleton, Cheshire; *s.* Conisholme Boy 347, *d. by* Eclipse 111.

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[1] Champion Prize of £20 given by the Shorthorn Society for the best Shorthorn Cow or Heifer in Classes 67-70.

[2] Prizes given by the Lincolnshire Red Short-horn Association.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

465 **II.** (**£10.**)—JOHN SEARBY, Crown Farm, Croft, Wainfleet, Lincs, for **Keddington Ruby** 1243, born Feb. 26, 1897, bred by E. H. Cartwright, Keddington Grange, Louth; *s.* Bigley 319, *d.* Keddington Skipworth 2nd *by* Commodore 81.

463 **R. N. & H. C.**—JOHN EVENS, for **Royal Burton.**

464 **H. C.**—J. W. MEASURES, for **Weston Nonpareil King.**

Com.—JOSEPH BOWSER, for No. 460, **Smethwick Prince**; RICHARD AND ROBERT CHATTERTON, for No. 461, **Councillor.**

Class 72.—*Lincolnshire Red Short-horn Bulls, calved in* 1900.[1] [5 entries.]

469 **I.** (**£10.**)—JOHN MARRIOTT, The West Lea, Cropwell Butler, Nottingham, for **Cropwell Royal,** born March 7; *s.* Lincoln Sailor 1597, *d.* Cropwell Ladylike (vol. v. p. 137) *by* Leadenham Marksman 825.

466 **II.** (**£5.**)—RICHARD AND ROBERT CHATTERTON, Stenigot, Lincoln, for **Red Chief,** born Jan. 19; *s.* Sirdar 1676, *d.* Stenigot Red Rose 2nd (vol. i., p. 120) *by* Kinsman 21st (57206).

470 **R. N. & H. C.**—SIR ROBERT WILMOT, BT., for **Chief Secretary.**

H. C.—JOHN LANGHAM, for No. 467, **Brandon Chief Justice**; JOHN MARRIOTT, for No. 468, **Cropwell Bushman.**

Class 73.—*Lincolnshire Red Short-horn Cows (in-milk), calved in* 1895, 1896, 1897, *or* 1898.[1] [4 entries.]

471 **I.** (**£15.**)—RICHARD AND ROBERT CHATTERTON, Stenigot, Lincoln, for **Stenigot Violet 2nd,** born June 23, 1897, calved June 5, 1901; *s.* Stenigot Knight 2nd 527, *d.* Stenigot Violet (vol. ii. p. 121) *by* Comet 79.

474 **II.** (**£10.**)—J. W. FARROW, Strubby Manor, Alford, born Nov. 8. 1896 calved May 18, 1901; *s.* Weighty Tom 2nd 558, *d. by* Thumper 550.

472 **R. N. & H. C.**—JOHN EVENS, for **Flossy**; and **Com.** for No. 473, **Nancy.**

Class 74.—*Lincolnshire Red Short-horn Heifers, calved in* 1899 *or* 1900.[1] [3 entries.]

475 **I.** (**£10.**)—RICHARD AND ROBERT CHATTERTON, Stenigot, Lincoln, for **Stenigot Daisy 6th,** born Jan. 11, 1899; *s.* Wrangler (71901), *d.* Stenigot Daisy 4th *by* County Member 83.

476 **II.** (**£5.**)—JOHN LANGHAM, Hough Grange, Grantham, for **Brandon Nonpareil,** born April 19, 1899; *s.* Chancellor 332, *d.* Wainfleet Keddington *by* Bigley 319.

477 **R. N. & H. C.**—JOHN MARRIOTT, for **Cropwell Sunshine.**

Herefords.

Class 75.—*Hereford Bulls, calved in* 1897 *or* 1898. [5 entries.]

480 **I.** (**£15, & Champion.**[2])—EDWARD FARR, Court of Noke, Pembridge, for **Britisher** 19261, born April 29, 1897, bred by A. E. Hughes, Wintercott, Leominster; *s.* Albion 15027, *d.* Plum 4th *by* Cheerful 6351.

478 **II.** (**£10.**)—THE EARL OF COVENTRY, Croome Court, Severn Stoke, Worcestershire, for **Mercury** 20192, born March 17, 1898; *s.* Viscount 18648, *d.* Minerva 2nd *by* Good Boy 7668.

482 **III.** (**£5.**)—H. W. TAYLOR, Showle Court, Ledbury, for **Sorcerer** 20339, born Feb. 23, 1898, bred by A. P. Turner, The Leen, Pembridge, Herefordshire; *s.* Clarence 15944, *d.* Speedwell *by* Statesman 14938.

479 **R. N. & H. C.**—W. H. DAVIES, for **Admiral.**

481 **H.C.**—RICHARD GREEN, for **Whittern Sovereign.**

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[1] Prizes given by the Lincolnshire Red Short-horn Association.

[2] Champion Prize of £10 10*s.* given by the Hereford Cattle Breeders' Association for the best Hereford Bull in Classes 75–77.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 76.—*Hereford Bulls, calved in* 1899. [19 entries, 3 absent.]

498 **I. (£15, & R. N. for Champion.[1])**—John Tudge, Duxmoor, Craven Arms, Salop, for **Albany** 20434, born Jan. 25, bred by A. E. Hughes, Wintercott, Leominster; *s.* Albion 15027, *d.* Luna 2nd *by* Cheerful 6351.

490 **II. (£10.)**—Capt. E. L. A. Heygate, Buckland, Leominster, for **Iron Duke** 20717, born Feb. 22; *s.* Iron King 18884, *d.* Cherry Ripe *by* Thick Set 17574.

483 **III. (£5.)**—W. T. Barneby, Saltmarshe Castle, Bromyard, for **Gambler** 20639, born Jan. 23; *s.* Happy Hampton 16097, *d.* Gamester Lady *by* Horace Bonnor 13138.

486 **R. N. & H. C.**—The Earl of Coventry, for **Vishnu.**

494 **H. C.**—Sir Joseph Pulley, Bt., for **Eaton Defender 12th.**

Com.—R. D. Cleasby, for No. 485, **Major-General**; William Thomas, for No. 497, **Duke of Avondale**; A. P. Turner, for No. 499, **Gilderoy.**

Class 77.—*Hereford Bulls, calved in* 1900. [20 entries, 2 absent.]

511 **I. (£15.)**—A. E. Hughes, Wintercott, Leominster, for **Nelson,** born Jan. 23; *s.* Glendower 20042, *d.* Nelly (vol. xxviii. p. 436) *by* Albion 15027.

510 **II. (£10.)**—A. E. Hughes, for **Lambton,** born Jan 18; *s.* Nonpareil 19614, *d.* Lofty 2nd (vol. xxvi. p. 416) *by* Seabreeze 14153.

506 **III. (£5.)**—The Earl of Coventry, Croome Court, Worcs., for **Vatican,** born Jan. 8; *s.* Gaudy Prince 19425, *d.* Viscountess *by* Viscount 18648.

515 **R. N. & H. C.**—John Price, Court House, Pembridge, for **Lord Roberts.**

H. C.—W. T. Barneby, for No 502, **Obelisk**; Capt. P. A. Clive, M.P., for No. 503, **Whitfield Roberts.**

Com.—Edward Farr, for No. 508, **Pom Pom**; John Price, for No. 514, **Gordon**; A. P. Turner, for No. 518, **Magnate.**

Class 78.—*Hereford Cows (in-milk), calved in* 1895, 1896, *or* 1897. [3 entries, none absent.]

522 **I. (£10, & Champion.[2])**—Richard D. Cleasby, Penoyre, Brecon, for **Dainty 10th** (vol. xxviii. p. 253), born March 30, 1896, calved June 5, 1901; *s.* Overseer 16249, *d.* Dainty 6th *by* Gemmesco 8647.

24 **II. (£5.)**—John Tudge, Duxmoor, Craven Arms, Salop, for **Rustic Maid** (vol. xxxi. p. 670), born April 9, 1897, calved April 15, 1901, bred by the late Thomas Myddleton, Llynaven, Aston-on-Clun; *s.* Ploughboy 17424, *d.* Miss Nobleman 21st *by* Liberal Tom 7085.

Class 79.—*Hereford Heifers (in-milk), calved in* 1898. [5 entries, 2 absent.]

527 **I. (£10.)**—Richard Green, The Whittern, Kington, Herefordshire, for **Waterweed,** born Feb. 17, calved April 5, 1901; *s.* Diplomat 18828, *d.* Westeria (vol. xxviii. p. 372) *by* Pioneer 16269.

526 **II. (£5.)**—David Evans, Ffrwdgrech, Brecon, for **Friend 2nd** (vol. xxx. p. 271), born Jan. 25, calved Feb. 13, 1901; *s.* Titus 17577, *d.* Friend *by* Blücher 2nd 18246.

525 **R. N. & Com.**—W. H. Davies, for **Julia 3rd.**

Class 80.—*Hereford Heifers, calved in* 1899. [7 entries, 1 absent.]

532 **I. (£15, & R. N. for Champion.[2])**—S. Harold Armitage, Upper Newton, Kinnersley, Eardisley, Herefordshire, for **Delta** (vol. xxxi. p. 194), born Jan. 9; *s.* Tip Top 19130, *d.* Dorothy *by* Byron 13656.

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[1] Champion Prize of £10 10*s.* given by the Hereford Cattle Breeders' Association for the best Hereford Bull in Classes 75–77.

[2] Champion Prize of £10 10*s.* given by the Hereford Cattle Breeders' Association for the Hereford Cow or Heifer in Classes 78–81.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

533 II. (£10.)—RICHARD GREEN, The Whittern, Kington, Herefordshire, for **Ladysmith**, born Jan. 2; *s.* Diplomat 18328, *d.* Lady Helen (vol. xxviii. p. 369) *by* Pioneer 16269.

530 III. (£5.)—HIS MAJESTY THE KING, Royal Farms, Windsor, for **Sophie** (vol. xxxi. p. 176), born Jan. 16, bred by Her late Majesty Queen Victoria; *s.* Lancelot 19506, *d* Sedate *by* Pioneer 14025.

536 R. N. & H. C.—JOHN TUDGE, for **Princess Royal.**

Class 81.—*Hereford Heifers, calved in* 1900. [17 entries, 3 absent.]

545 I. (£15.)—RICHARD GREEN, The Whittern, Kington, Herefordshire, for **Prudentia**, born Jan. 4; *s.* Curly Boy 17793, *d.* Prudence (vol. xxviii. p. 377) *by* Whittern Grove 10843.

538 II. (£10.)—W. T. BARNEBY, Saltmarshe Castle, Bromyard, for **Mistletoe**, born Jan. 4; *s.* Happy Hampton 16097, *d.* Mischief (vol. xxxi. p. 215) *by* Ferdinand 17259.

544 III. (£5.)—RICHARD GREEN, for **Maysie**, born Jan. 16; *s.* Curly Boy 17793, *d.* Marjory (vol. xxviii. p. 370) *by* Sterling 14943.

553 R. N. & H. C.—JOHN TUDGE, for **Royal Gem.**

H. C.—W. T. BARNEBY, for No. 537, **Happy Accident**; H. HAYWOOD, for No. 549, **Peerless.**

Com.—RICHARD GREEN, for No. 543, **Ladybrand**; H. HAYWOOD, for No. 548, **Loyal Lady**; A. E. HUGHES, for No. 550, **Bartonia**; REES KEENE, for No. 551, **Miss Rokeby**; H. F. RUSSELL, for No. 552, **Camelia.**

Devons.

Class 82.—*Devon Bulls, calved in* 1897, 1898, *or* 1899. [7 entries, none absent.]

559 I. (£15, & Champion.[1])—J. C. WILLIAMS, Caerhays, St. Austell, Cornwall, for **Dramatist 4015**, born July 5, 1898; *s.* Pretty Middling 2859, *d.* Ellen Terry 3rd 12561 *by* Marmaduke 2280.

556 II. (£10, & R. N. for Champion.[1])—ALFRED BOWERMAN, Capton, Williton, Taunton, for **Sir Walter 3959**, born April 8, 1897; *s.* Lord Culverhay 3469, *d.* Apricot 13743 *by* Palmerston 2474.

560 III. (£5.)—J. C. WILLIAMS, for **Woodman**, born May 19, 1899; *s.* Woodcock 3831, *d.* Lady Queen 2nd 14291 *by* Marmion 2642.

555 R. N. & H. C.—ALFRED BOWERMAN, for **Bean Planter.**

554 H. C.—HIS MAJESTY THE KING, for **Benedictine.**

Com.—J. F. R. MORRIS, for No. 557, **Union Jack**; THE HON. E. W. B. PORTMAN, for No. 558, **Hestercombe General.**

Class 83.—*Devon Bulls, calved in* 1900. [6 entries, 1 absent.]

561 I. (£15.)—ALFRED BOWERMAN, Capton, Williton, Taunton, for **Ringleader**, born Jan. 1; *s.* Lord Culverhay 3469, *d.* Allspice 14965 *by* Pretty Middling 3rd 3173.

565 II. (£10.)—J. C. WILLIAMS, Caerhays, St. Austell, for **Foxglove**, born Feb. 13; *s.* Afterthought 3375, *d.* Fitful 2nd 14286 *by* Cardsharper 3082.

566 III. (£5.)—J. C. WILLIAMS, for **Musa**, born Jan. 27; *s.* Pretty Middling 2859, *d.* Mirabel 3rd 15510 *by* Afterthought 3375.

564 R. N.—E. J. STANLEY, M.P., for **Quantock Tom.**

562 Com.—E. C. NORRISH, for **Sandford Good Luck.**

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[1] Champion Prize of £10 10*s.* given by the Devon Cattle Breeders' Association for the best Devon Bull in Classes 82 and 83.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 84.—*Devon Cows (in-milk), calved in* 1895, 1896, *or* 1897. [3 entries.]

567 I. (£15, & Champion.[1])—ALFRED BOWERMAN, Capton, Williton, Taunton, for **Sally** 15571, born Jan. 10, 1895, calved Jan. 6, 1901; *s.* Starlight, 3514, *d.* Dolly 5th 9482 *by* Lord Ilbear 1779.
569 II. (£10.)—SIR W. R. WILLIAMS, BT., Upcott, Barnstaple, for **Fiction 6th** 15518, born Jan. 1, 1896, calved Jan. 2, 1901; *s.* Pretty Middling 2nd 3172, *d.* Fiction 4th 12580 *by* Captain 2204.
568 R. N.—THE HON. E. W. B. PORTMAN, for **Tulip 10th of Pound.**

Class 85.—*Devon Heifers (in-milk), calved in* 1898. [2 entries.]

570 I. (£15.)—THE HON. E. W. B. PORTMAN, Hestercombe, Taunton, for **Hestercombe Princess** 16464, born March 12, calved March 30, 1901; *s.* Duke of Currypool 3096, *d.* Longhorns 5th 14671 *by* Lordship 2820.
571 II. (£10.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, for **Quantock Venus 16th** 16564, born April 9, calved April 19, 1901; *s.* Goodwill 3592, *d.* Quantock Venus 10th 14813 *by* Duke of Bridgwater, 3258.

Class 86.—*Devon Heifers, calved in* 1899. [7 entries, 1 absent.]

573 I. (£10.)—BOVINE, LTD., 44 Bishopsgate Street Without, London, E.C., for **Bovine Princess**, born June 4, bred by E. J. Stanley, M.P., Quantock Lodge, Bridgwater; *s.* Quantock Jubilee 3943, *d.* Quantock Princess 2nd 14810 *by* Duke of Bridgwater 3258.
576 II. (£5.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, for **Quantock Beauty 16th** 17172, born Jan. 23; *s.* Tregothan 2902, *d.* Beauty 9th 12118 *by* Duke of Wellington 1955.
572 R. N. & H. C.—ALFRED BOWERMAN, for **Capton Belle.**
575 H. C.—THE HON. E. W. B. PORTMAN, for **Hestercombe Roseleaf.**
578 Com.—SIR W. R. WILLIAMS, BT., for **Cherry.**

Class 87.—*Devon Heifers, calved in* 1900. [7 entries, 1 absent.]

582 I. (£10, & R. N. for Champion.[1])—THE HON. E. W. B. PORTMAN, Hestercombe, Taunton, for **Hestercombe Roseleaf 2nd**, born April 29; *s.* Duke of Pound 29th 3725, *d.* Roseleaf 15344 *by* Duke of Currypool 3096.
581 II. (£5.)—R. W. C. EVERED, Cridlands, Spaxton, Bridgwater, for **Princess 4th**, born June 18; *s.* Quantock Bridegroom 4097, *d.* Quantock Princess 2nd 14810 *by* Duke of Bridgwater 3258.
583 R. N. & H. C.—COLONEL A. F. WALTER, for **Ruby 10th of Pound.**
579 H. C.—HIS MAJESTY THE KING, for **Carrie.**
Com.—ALFRED BOWERMAN, for No. 580, **Capton Apricot**; J. C. WILLIAMS, for No. 584.

Sussex.

Class 88.—*Sussex Bulls, calved in* 1897, 1898, *or* 1899. [5 entries, 1 absent.]

588 I. (£15.)—THE HON. R. P. NEVILL, Birling Manor, West Malling, Kent, for **Confidence 2nd** 1630, born Jan. 3, 1898; *s.* Confidence 1498, *d.* Lady Lyne 4507 *by* Papa 709.
586 II. (£10.)—E. E. BRABY, Drungewick Manor House, Rudgwick, Sussex, for **Drungewick Prebble** 1666, born Dec. 9, 1898, bred by the late F. Warde, Aldon, Addington, West Malling, Kent; *s.* Aldon 2nd 1451, *d.* Aldon Prebble 6056 *by* Red Hill Gold-dust 927.

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[1] Champion Prize of £10 10*s.* given by the Devon Cattle Breeders' Association for the best Devon Cow or Heifer in Classes 84-87.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

590 III. (*£5.*)—PHILIP SAILLARD, Buchan Hill, Crawley, Sussex, for **Bewbush Marquis** 1720, born March 14, 1899; *s.* Bewbush King 1575, *d.* Galatea 5th 6931 *by* What's Wanted 1329.

587 R. N. & H. C.—THE EARL OF DERBY, K.G., for **Nero.**

Class 89.—*Sussex Bulls, calved in* 1900. [6 entries, 1 absent.]

593 I. (*£15.*)—W. W. HUBBLE, The Elms, Hunton, Maidstone, for **Lieutenant 3rd** 1759, born Jan. 16; *s.* Lieutenant 1362, *d.* Laura A 6th of Haslemere 6119, *by* Sir John of Jayes 1155.

592 II. (*£10.*)—JOSEPH GODMAN, Park Hatch, Godalming, for **Nobleman 11th** 1755, born Jan. 4; *s.* Golden Noble 2nd 1547, *d.* Gentle 24th 7370 *by* Nobleman 8th 1377.

595 R. N. & H. C.—W. F. WINCH, Tilsden, Cranbrook, Kent, for **Pelican.**

Class 90.—*Sussex Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [2 entries.]

597 I. (*£15.*)—THE EARL OF DERBY, K.G., Birtley, Witley, Godalming, for **Cinderella** 7067, born April 6, 1896, calved Aug. 3, 1900; *s.* Proud Prince 1249, *d.* Cuckoo 5462 *by* Frank 997.

598 R. N. & H. C.—PHILIP SAILLARD, for **Maud 2nd.**

Class 91.—*Sussex Heifers, calved in* 1899. [5 entries, 1 absent.]

600 I. (*£10.*)—JOSEPH GODMAN, Park Hatch, Godalming, for **Noble Lady 24th** 7953, born March 3; *s.* Lord George Napier 1372, *d.* Noble Lady 12th 6527 *by* Oxford Duke 6th 1188.

603 II. (*£5.*)—EARL WINTERTON, Shillinglee Park, Petworth, Sussex, for **Speculation 5th** 8125, born Feb. 21; *s.* Brantridge Duke 1408, *d.* Speculation 2nd 6385 *by* Saturn 1043.

601 R. N. & H. C.—W. W. HUBBLE, The Elms, Hunton, Maidstone, for **Peony.**

602 Com.—PHILIP SAILLARD, for **Bewbush Princess.**

Class 92.—*Sussex Heifers, calved in* 1900. [6 entries, 1 absent.]

604 I. (*£10.*)—THE EARL OF DERBY, K.G., Birtley, Witley, Godalming, for **Firle Valentine** 8195, born Feb. 14; *s.* Leap Year 1483, *d.* Firle 6th 4910 *by* Young Rival 658.

605 II. (*£5.*)—W. W. HUBBLE, Hunton, Maidstone, for **Mimosa** 8262, born Jan. 17; *s.* Lieutenant 1362, *d.* Minerva 7217 *by* Oxford Duke 1st 840.

609 R. N. & H. C.—EARL WINTERTON, for **Stephanotis 7th.**

607 H. C.—PHILIP SAILLARD, for **Bewbush Wind 2nd.**

608 Com.—W. F. WINCH, for **Tilsden Lady.**

Longhorns.

Class 93.—*Longhorn Bulls, calved in* 1897 *or* 1898. [3 entries.]

612 I. (*£10.*)—H. JASPER SELWYN, Leek Wootton, Warwick, for **Wootton Wonder** 371, dark brindle, born Jan. 30, 1897; *s.* Pretender 2nd 334, *d.* Pink *by* Baddesley.

610 II. (*£5.*)—THE HON. E. A. FITZ-ROY, Fox Hill, West Haddon, Rugby, for **Cæsar** 293, red brindle and white, born March 20, 1898, bred by W. H. Sale, Arden Hill, Atherstone; *s.* Earl of Upton 11th 308, *d.* Shaws Fradley Beauty *by* Duke 361.

611 R. N. & H. C.—W. H. SALE, Arden Hill, Atherstone, for **Romeo 2nd.**

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 94.—*Longhorn Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [3 entries, 1 absent.]

613 I. (£10.)—W. H. SALE, Arden Hill, Atherstone, for **Barton Sunshine** (vol. ii. p. 17), red and white, born Dec. 26, 1896, calved Oct. 22, 1900, bred by H. Houghton, Osbaston, Nuneaton; *s.* Warwickshire Lad 369, *d.* Ladylike *by* Fradley Prior 312.

614 II. (£5.)—W. H. SALE, for **Daisy's Fairest and Best** (vol. ii. p. 21), red and white, born March 14, 1897, calved April 28, 1901; *s.* Warwickshire Lad 369, *d.* Daisy *by* Peter 332.

Welsh.

Class 95.—*Welsh Bulls, calved in* 1897 *or* 1898. [7 entries, 2 absent.]

620 I. (£15, & Champion.[1])—COL. HENRY PLATT C.B., Gorddinog, Llanfairfechan, for **Mallard** 433, born May, 1897, bred by C. F. Priestley, Hirdrefaig, Llangefni; *s.* Sir Fon 249, *d.* Taihirion 1041 *by* Johnny.

617 II. (£10.)—JOHN GRIFFITHS, Bwlchmaur, Llanybyther, Cardiganshire, for **Gwenog Lad**, born Jan. 12, 1898.

616 III. (£5.)—R. M. GREAVES, Wern, Portmadoc, for **Madoc Boy** 398, born June 24, 1897; *s.* Madoc Lad 311, *d.* Royal Windsor 2nd 1035 *by* William Pennant 264.

621 R. N. & H. C.—COL. HENRY PLATT, C.B., for **Plas Emperor.**

Class 96.—*Welsh Bulls, calved in* 1899. [5 entries.]

625 I. (£15, & R. N. for Champion.[1])—O. PARRY JONES, Plas Llechylched Bryngwran, Anglesea, for **Gold Seeker**, born Jan. 20, bred by Professor Winter, University College Farm, Llangefni.

624 II. (£10.)—LORD HARLECH, Glyn, Talsarnau, for **Ensign**, born Jan. 20; *s.* Llandecwyn 343, *d.* Little Empress 3rd 1141 *by* Goronwy ap Gwilym 3rd 283.

623 III. (£5.)—LORD HARLECH, for **Crusher**, born Feb. 13; *s.* Llandecwyn 343, *d.* Lady Helen 3rd 902 *by* Connaught 156.

626 R. N. & H. C.—COL. HENRY PLATT, C.B., for **Madryn Berw.**

627 H. C.—JOHN WORTHINGTON, for **Black Prince.**

Class 97.—*Welsh Bulls, calved in* 1900. [5 entries, none absent.]

629 I. (£15.)—R. M. GREAVES, Wern, Portmadoc, for **Lord Roberts**, born Feb. 24, bred by Col. Henry Platt, C.B., Gorddinog, Llanfairfechan; *s.* Madoc Lad 311, *d.* Traffol 2nd 1218 *by* The Alderman 358.

630 II. (£10.)—R. M. GREAVES, for **Ringleader**, born Feb. 1; *s.* Mafeking, *d.* Morwyn 5th 1132 *by* Baron of Tan-y-bwlch 256.

631 III. (£5.)—COL. HENRY PLATT C.B., Gorddinog, Llanfairfechan, for **Tanybwlch Buller**, born Jan. 2, bred by W. E. Oakeley, The Plâs, Tan-y-bwlch; *s.* Cawr 417, *d.* Don 1184 *by* Hwfa 420.

632 R. N. & H. C.—JOHN WORTHINGTON, for **Beefsteak.**

Class 98.—*Welsh Cows (in-milk), calved in* 1895, 1896, *or* 1897. [5 entries, 1 absent.]

637 I. (£10, & Champion.[2])—COL. HENRY PLATT, C.B., Gorddinog, Llanfairfechan, for **Queen of Spades 2nd** 1034, born Feb. 19, 1895, calved Sept. 15, 1900; *s.* The Alderman 358, *d.* Queen of Spades 1033.

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[1] Champion Silver Cup, value £5 5*s.*, given by the North Wales Black Cattle Society for the best Welsh Bull in Classes 95-97.

[2] Champion Silver Cup, value £5 5*s.*, given by the North Wales Black Cattle Society for the best Welsh Cow or Heifer in Classes 98-101.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

34 II. (*£5.*)—R. M. GREAVES, Wern, Portmadoc, for **Ffynon Beuno** 1130, born Jan. 2, 1895, calved August 14, 1900; *s.* St. Beuno 316, *d.* Allt Ddu 704 *by* Gutto Ddu 165.

635 **R. N.**—J. & W. OWEN, Hafod, Llanboidy, Whitland, for **Blodwen.**
636 **Com.**—COL. HENRY PLATT, C.B., for **Marian Lady.**

Class 99.—*Welsh Heifers* (*in-milk*), *calved in* 1898. [3 entries.]

638 I. (£10.)—R. M. GREAVES, Wern, Portmadoc, for **Pyrites 2nd** 1190, born Jan. 3, calved May 20, 1901, bred by W. E. Oakeley, The Plâs, Tan-y-bwlch; *s.* Hwfa 420, *d.* Pyrites 973 *by* Ardudwy 255.
640 II. (*£5.*)—COL. HENRY PLATT, C.B., Gorddinog, Llanfairfechan, for **Madryn Bodvel**, born Feb. 1, calved March 30, 1901, bred by Griffith Roberts, Bodvel Hall, Pwllheli; *s.* Glandwr 442, *d.* Bodvel Lady 772 *by* Duke of Pentremawr 2nd 182.

639 **R. N.**—J. & W. OWEN, for **Gwladys.**

Class 100.—*Welsh Heifers, calved in* 1899. [5 entries.]

642 I. (*£15*, & **R. N. for Champion.**[1])—R. M. GREAVES, Wern, Portmadoc, for **Llwyn**, born Jan. 2, bred by W. E. Oakeley, The Plâs, Tan-y-bwlch; *s.* Hwfa 420, *d.* Pyrites 973 *by* Ardudwy 255.
641 II. (£10.)—DAVID EVANS, Dyffryn, Llanboidy, Whitland, Carmarthenshire, for **Llanboidy Queen**, born March 25; *s.* Llanboidy Jack 2nd, *d.* Cowslip *by* Penally Squire.
643 III. (*£5.*)—COL. HENRY PLATT, C.B., Gorddinog, Llanfairfechan, for **Traffol 3rd**, born Jan. 27; *s.* Madoc Lad 311, *d.* Traffol 920 *by* Roderick 246.

644 **R. N. & H. C.**—COL. HENRY PLATT, C.B., for **Ty-mawr Gem.**
645 **H. C.**—JOHN WILLIAMS, for **Ogwen.**

Class 101.—*Welsh Heifers, calved in* 1900. [7 entries.]

646 I. (£15.)—EVAN EVANS, Maesmynach, Llanybyther, Cardiganshire, for **Tugela**, born March 12; *s.* Mynach Lad, *d.* Duchess.
648 II. (£10.)—DANIEL JENKINS, Glanwern, Talsarn, Cardiganshire, for **Gwladys**, born March 28; *s.* Starling 396, *d.* Betsy *by* Ap Gwffydd.
647 III. (*£5.*)—R. M. GREAVES, Wern, Portmadoc, for **Marion Beauty**, born Jan. 10, bred by R. W. Pritchard, Coed Marion, Carnarvon; *s.* Cawr 417, *d.* Bloden Meirionydd.

649 **R. N. & H. C.**—COL. HENRY PLATT, C.B., for **Traffol 4th.**
H. C.—JOHN WILLIAMS, for No. 650, **Winifred**; JOHN WORTHINGTON, for No. 651, **Carnation**, and No. 652, **Rosebud.**

Red Polled.

Class 102.—*Red Polled Bulls, calved in* 1897, 1898, *or* 1899
[6 entries, 3 absent.]

654 I. (*£15*, & **Champion.**[2])—LORD AMHERST OF HACKNEY, Didlington Hall, Brandon, Norfolk, for **Redvers** 6570, born March 12, 1898, bred by the late J. J. Colman, Norwich; *s.* Rosy Boy 4627, *d.* Telba 8251 *by* Game Boy.

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[1] Champion Silver Cup, value £5 5*s.*, given by the North Wales Black Cattle Society for the best Welsh Cow or Heifer in Classes 98–101.
[2] Champion Prize of £10, given by the Red Polled Society for the best Red Polled Bull in Classes 102 and 103.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

658 **II. (£10.)**—A. J. SMITH, Rendlesham, Woodbridge, for **Rowdy Roy** 6595, born May 24, 1898; *s.* Rowdy 4628, *d.* Mingle 5733 *by* Stout 581.

Class 103.—*Red Polled Bulls, calved in* 1900.
[9 entries, 1 absent.]

667 **I. (£15, & R. N. for Champion.[1])**—JAMES E. PLATT, Howbury Hall, Bedford, for **Pistol**, born Jan. 19; *s.* Champion 5370, *d.* Bruna 12080 *by* Ruby Prince 4131.

660 **II. (£10.)**—LORD AMHERST OF HACKNEY, Didlington Hall, Brandon, Norfolk, for **Royal Standard** (vol. xviii.), born Jan 26; *s.* Redvers 6570, *d.* Jubilee Emblem 12483 *by* Caister Spark 3413.

663 **III. (£5.)**—THE HON. AILWYN E. FELLOWES, M.P., Honingham Hall, Norwich, for **Albert**, born May 16; *s.* The Pope 4581, *d.* Annie 7642 *by* Starston Jew 2084.

665 **R. N. & H. C.**—R HARVEY MASON, Necton Hall, Swaffham, for **Kohinoor.**

666 **Com.**—R. HARVEY MASON, for **Prince Rupert.**

Class 104.—*Red Polled Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [4 entries, 1 absent.]

670 **I. (£15, & Champion.[2])**—JAMES E. PLATT, Howbury Hall, Bedford, for **Dormouse** 13419, born April 22, 1898, calved Feb. 8, 1901, bred by the late J. J. Colman, Easton, Norwich; *s.* Redman 5147, *d.* Dorena 6308 *by* Iago 1025.

671 **II. (£10.)**—JAMES E. PLATT, for **Red Lass** 14121, born Jan 23, 1898, calved Jan. 1, 1901, bred by the late J. J. Colman, Easton, Norwich; *s.* Rosy Boy 4627, *d.* Red Top 8911 *by* Red Prince 2902.

668 **R. N. & H. C.**—LORD AMHERST OF HACKNEY, for **Saltarella 6th.**

Class 105.—*Red Polled Heifers, calved in* 1899.
[5 entries, none absent.]

673 **I. (£10, & R. N. for Champion.[2])**—THE HON. AILWYN E. FELLOWES, M.P., Honingham Hall, Norwich, for **Ardent** 14469, born March 28; *s.* The Pope 4581, *d.* Espérance 6340 *by* Erebus 841.

675 **II. (£5.)**—JAMES E. PLATT, Howbury Hall, Bedford, for **Tiara** 15959, born Jan. 31, bred by the late J. J. Colman, Easton, Norwich; *s.* Champion 5370, *d.* Necklace 11610 *by* Red Prince 2902.

676 **R. N. & H. C.**—ALFRED J. SMITH, for **Eyke Dairymaid.**

672 **Com.**—THE HON. AILWYN E. FELLOWES, M.P., for **Anthea.**

Class 106.—*Red Polled Heifers, calved in* 1900. [4 entries, 1 absent.]

680 **I. (£10.)**—JAMES E. PLATT, Howbury Hall, Bedford, for **Sleeping Beauty**, born March 1, bred by the late F. E. Colman, Nork Park, Epsom Downs; *s.* Red Knight 5818, *d.* Girl 9377 *by* Albion 2982.

679 **II. (£5.)**—J. B. DIMMOCK, Shotford Hall, Harleston, for **Shotford Duchess**, born Feb. 19, bred by the Duchess of Hamilton, Easton Park, Wickham Market; *s.* Bismarck 6004, *d.* Graceful 3rd *by* Caister Spark.

677 **R. N. & H. C**—LORD AMHERST OF HACKNEY, for **Popsey 6th.**

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[1] Champion Prize of £10, given by the Red Polled Society for the best Red Polled Bull in Classes 102 and 103.

[2] Champion Prize of £10, given by the Red Polled Society for the best Red Polled Cow or Heifer in Classes 104–106.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Aberdeen Angus.

Class 107.—*Aberdeen Angus Bulls, calved in* 1897, 1898, *or* 1899. [9 entries, 1 absent.]

683 I. (£15, & R. N. for Champion.[1])—J. J. CRIDLAN, Maisemore Park, Gloucester, for **Elate** 16513, born Dec. 14, 1898, bred by Arthur Egginton, South Ella, Hull; *s.* Mailbag 13637, *d.* Elite 24028 *by* Esbros 10816.

686 II. (£10.)—ALEXANDER MCLAREN, Auchnaguie, Tullymet, Ballinluig, N.B., for **Ben Gloe** 17504, born June 4, 1899; *s.* Delamere 13305, *d.* Witch of Endor 32nd 26103 *by* Monarch 8th 11093.

688 III. (£5.)—C. W. DYSON PERRINS, Ardross Castle, Alness, Ross-shire, for **Rosador** 15996, born Dec. 11, 1897, bred by Sir George Macpherson Grant, Bart., The Castle, Ballindalloch; *s.* Edmeston 12445, *d.* Meadow Rose of Ballindalloch 20569 *by* Enthusiast of Ballindalloch 8289.

687 R. N. & H. C.—L. A. MACPHERSON, Wyrley Grove, Pelsall, for **Burnatum.**

681 H.C.—THE REV. C. BOLDEN, for **Boniface of Preston.**

Com.—THE REV. C. BOLDEN, for No. 682, **Pundit of Preston**; R. W. HUDSON, for No. 685, **Governor of Abergeldie**; THOMAS SMITH, for No. 689, **Allan of Powrie.**

Class 108.—*Aberdeen Angus Bulls, calved in* 1900. [7 entries, 4 absent.]

690 I. (£15.)—T. H. BAINBRIDGE, Eshott Hall, Felton, Northumberland, for **Maramere** 18160, born Jan. 3, bred by A. McLaren, Auchnaguie, Tullymet, Ballinluig; *s.* Delamere 13305, *d.* Marie 4th 24753 *by* Monarch 8th 11093.

694 II. (£10.)—R. W. HUDSON, Danesfield, Great Marlow, Bucks, for **Primus of Danesfield** 18365, born Feb. 11; *s.* Junior Jehu 14536, *d.* Pride's Flower 22374 *by* Cerberus 8181.

691 R. N.—J. J. CRIDLAN, for **Clive of Maisemore.**

Class 109.—*Aberdeen Angus Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [7 entries, none absent.]

701 I. (£15, & Champion.[1])—THOMAS SMITH, Powrie, Dundee, for **Pride of Powrie 9th** 26098, born May 13, 1897, calved Feb. 2, 1901; *s.* Monarch 8th 11093, *d.* Pride 2nd of Lynemore 14947 *by* Provost of Lynemore 6353.

700 II. (£10.)—R. W. HUDSON, Danesfield, Great Marlow, Bucks, for **Lady May of Advie** 25526, born Jan. 15, 1896, calved Jan. 14, 1901, bred by John Grant, Advie Mains, Strathspey; *s.* Provost of Advie 11217, *d.* Lady Love of Advie 21846 *by* Rustler 8761.

698 III. (£5.)—T. H. BAINBRIDGE, Eshott Hall, Felton, for **Jipsy of Benton 4th** 26125, born Jan. 15, 1897, calved Dec. 24, 1900, bred by Clement Stephenson, Sandyford Villa, Newcastle-on-Tyne; *s.* Esmond of Ballindalloch 8304, *d.* Jipsy 11th 17367 *by* Rover of Powrie 4991.

703 R. N. & H. C.—THOMAS SMITH, for **Witch of Endor 36th.**

699 H. C.—J. J. CRIDLAN, for **Pride 13th of Kippendavie.**

697 Com.—T. H. BAINBRIDGE, for **Beauty of Eshott.**

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[1] Champion Gold Medal given by the Polled Cattle Society for the best Aberdeen Angus animal in Classes 107–110.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 110.—*Aberdeen Angus Heifers, calved in* 1899. [10 entries, 2 absent.]

704 I. (£10.)—T. H. BAINBRIDGE, Eshott Hall, Felton, for **Neat Nellie** 29426, born Feb. 1, bred by A. Whyte, Inverquharity, Kirriemuir; *s.* Melville Castle 15742, *d.* Nice Nellie 24908 *by* Marmion 9th 11052.

710 II. (£5.)—L. A. MACPHERSON, Wyrley Grove, Pelsall, Staffs, for **Sweet Sunrise** 28829, born Jan. 10; *s.* Lord Forward 14602, *d.* Sunrise of Wyrley 24459 *by* Dictator of Haddo 11583.

707 **R. N. & H. C.**—R. W. HUDSON, for **Joyful 2nd of Danesfield.**

708 **H. C.**—R. W. HUDSON, for **Tippet of Danesfield 2nd.**

Com.—THE REV. C. BOLDEN, for No. 705, **Monica of Preston**; ALEXANDER MCLAREN, for No. 709, **Maisie May.**

Galloways.

Class 111.—*Galloway Bulls, calved in* 1897, 1898, *or* 1899. [6 entries, 1 absent.]

719 I. (£15.)—ROBERT WILSON, Kilquhanity Farm, Dalbeattie, for **Macdougall 4th of Tarbreoch** 6841, born Feb. 15, 1897, bred by James Cunningham, Tarbreoch, Dalbeattie; *s.* Scottish Standard 6488, *d.* Maggie of Tarbreoch 8613 *by* Scottish Borderer 669.

715 II. (£10.)—ROBERT GRAHAM, Kirkconnel, Castle Douglas, for **Marmion 2nd** 7260, born May 12, 1898, bred by Andrew McGill, Barsalloch, Newton Stewart; *s.* Cumloden 6697, *d.* Fanny 4th of Barsalloch 14070 *by* Stanley 5810.

717 III. (£5.)—LEONARD PILKINGTON, Cavens, Dumfries, for **Banner of Naworth** 6986, born March 27, 1897, bred by the Countess of Carlisle, Naworth Castle, Brampton, Cumberland; *s.* Hadrian of Naworth 6423, *d.* Miss Gladys of Lanrick 13425 *by* Nestor 2nd 5467.

716 **R. N. & H. C.**—ROBERT JEFFERSON, for **Contender.**

714 **Com.**—FEATHERSTONE FENWICK, for **Grand Scot.**

Class 112.—*Galloway Bulls, calved in* 1900. [4 entries, 1 absent.]

720 I. (£15.)—WILLIAM BARBOUR, Troquhain, New Galloway, for **Mackenzie of Kilquhanity** 7863, born Jan. 8, bred by Robert Wilson, Kilquhanity Farm, Dalbeattie; *s.* Lord William of Durhamhill 7108, *d.* Mollie 5th of Lairdlaugh 15296 *by* Macduff 5905.

721 II. (£10.)—ROBERT GRAHAM, Kirkconnel, Castle Douglas, for **Guiding Hand** 7813, born March 28, bred by Thomas Robson, Bridgeford, Bellingham; *s.* Lord Douglas of the Green 6914, *d.* Doll of the Frolic 12874 *by* John Highlandman of Pedderhill 5170.

723 **R. N. & H. C.**—H. C. STEPHENS, for **Marmion.**

Class 113.—*Galloway Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [4 entries, 1 absent.]

725 I. (£15.)—ROBERT GRAHAM, Kirkconnel, Castle Douglas, for **Maggie 9th of Tarbreoch** 14403, born Feb. 20, 1895, calved Feb. 7, 1901, bred by James Cunningham, Tarbreoch, Dalbeattie; *s.* Campfollower 5042, *d.* Maggie of Tarbreoch 8613 *by* Scottish Borderer 669.

727 II. (£10.)—LEONARD PILKINGTON, Cavens, Dumfries, for **Lizzie of Tarbreoch** 15139, born May 18, 1897, calved Jan. 24, 1901, bred by James Cunningham, Tarbreoch, Dalbeattie; *s.* Campfollower 5042, *d.* Tarbreoch Lizzie 3rd 9680 *by* Harden 1151.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

726 III. (£5.)—ROBERT JEFFERSON, Rothersyke, Egremont, Cumberland, for **Impératrice** 14293, born Sept. 17, 1895, calved March 4, 1901; *s.* Macpherson 5454, *d.* Lady Dauntless 11185 *by* Dauntless 2878.

Class 114.—*Galloway Heifers, calved in* 1899. [5 entries, 1 absent.]

732 I. (£10.)—ROBERT WILSON, Kilquhanity Farm, Dalbeattie, Kirkcudbrightshire, for **Maggie of Kilquhanity** 16295, born Jan. 13, bred by James Cunningham, Tarbreoch, Dalbeattie; *s.* Banner of Naworth 6986, *d.* Maggie 10th of Tarbreoch 14747 *by* Campfollower 5042.

729 II. (£5.)—ROBERT JEFFERSON, Rotherskye, Egremont, Cumberland, for **Iolanthe 8th** 15975, born Jan. 13; *s.* Jubilee Gift 6856, *d.* Iolanthe 6th 12960 *by* Vale Royal of Closeburn 5013.

728 **R. N. & H. C.**—FEATHERSTONE FENWICK, for **Gem of the Forest.**

Highland.

Class 115.—*Highland Bulls, of any age.* [2 entries.]

734 I. (£15.)—H. C. STEPHENS, Cholderton Lodge, Salisbury, for **Lord Macdonald 1st**, red, born Jan. 25, 1900; *s.* Ceatharnach Bhuidhe 719, *d.* Lochlin 1st of Cholderton 3404 *by* Scarbhaidh 814.

733 **R. N. & H. C.**—H. C. STEPHENS, for **Ceatharnach Bhuidhe 1st.**

Class 116.—*Highland Cows or Heifers (in-milk), of any age.* [1 entry.]

735 I. (£15.)—H. C. STEPHENS, Cholderton Lodge, Salisbury, for **Romag 2nd** 2793, brindled, born April 20, 1886, calved April 15, 1901, bred by J. & A. McLaren, Dall, Killen, N.B.; *s.* Ossian of Dall 404, *d.* Romag 1st *by* Ossian of Athole 403.

Ayrshires.

Class 117.—*Ayrshire Bulls, of any age.* [2 entries.]

737 I. (£15.)—ANDREW MITCHELL, Barcheskie, Kirkcudbright, for **Enterprise** 4160, white and brown, born March 15, 1897, bred by W. P. Gilmour, Orchardton, Cumnock; *s.* Sonsie's Last of Orchardton 3874, *d.* Daisy of Orchardton 10094 *by* Craigs of Kyle of Drumjoan 1793.

736 II. (£10.)—ANDREW MITCHELL, for **Black Traveller**, black and white, born May 1, 1899, bred by Thomas Barr, Monkland, Kilmarnock; *s.* Traveller's Heir 2903, *d.* Mary *by* White Cockade 2852.

Class 118.—*Ayrshire Cows or Heifers (in-milk), of any age.* [4 entries, 1 absent.]

741 I. (£15.)—ANDREW MITCHELL, Barcheskie, Kirkcudbright, for **Strawberry**, roan, born June 1, 1898, calved June 8, 1901, bred by Thomas McCreath, Skaith, Newton Stewart; *s.* Coffee Cooler of Skaith 3497, *d.* Strawberry *by* Castle Stuart of Skaith 3208.

738 II. (£10.)—CHARLES DOUGLAS, M.P., Auchlochan, Lesmahagow, for **Mary 2nd**, brown and white, born Feb. 22, 1898, calved May 19, 1901, bred by W. Howie, Burnhouses, Galston; *s.* Prince Bismarck of Knockdon 3287, *d.* Mary Anne of Windyhill 9742 *by* Loudoun 275.

740 III. (£5.)—ANDREW MITCHELL, for **Heather**, white and brown, born April 5, 1898, calved June 2, 1901; *s.* Mischief Maker of Barcheskie 3892, *d.* Heather of Barcheskie 7875 *by* Traveller of Drumjoan 1441.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Jerseys.

N.B.- In the Jersey Classes, the number inserted within brackets after the name of an animal indicates the number of such animal in the Island Herd Book. A number without brackets indicates that the animal is registered in the English Jersey Herd Book.

Class 119.—*Jersey Bulls, calved in* 1897, 1898, *or* 1899. [7 entries, 1 absent.]

746 I. (£15.)—The Duke of Marlborough, Blenheim Palace, Woodstock, Oxon, for **Dewey** 6522, whole colour, born Aug. 2, 1898, bred by P. J. Ahier, St. Martin's, Jersey; *s.* Reminder 6384, *d.* Etna (7293) P.S.H.C. *by* Golden Fern's Lad 6236.

745 II. (£10.)—Col. H. McCalmont, M.P., Bishopswood, Ross, Herefordshire, for **Chief Justice**, whole colour, born July 11, 1899; *s.* Chancellor 6500, *d.* Wigton 6th (vol. vi. p. 630) *by* Flora's Lad 4098.

747 III. (£5.)—W. Buckley Roderick, Fronheulog, Llanelly, Carmarthenshire, for **Spion Kop**, dark grey, born March 7, 1899, bred by P. Poignand, St. Peter's, Jersey; *s.* Duplex 6538, *d.* Pastille (2855) P.S.C. *by* Sans Peur 5th 3776.

748 R. N. & H. C.—Lady de Rothschild, Aston Clinton, Tring, for **Manikin.**

Class 120.—*Jersey Bulls, calved in* 1900. [12 entries, 3 absent.]

757 I. (£10.)—Mrs. Charlotte McIntosh, Havering Park, Essex, for **Butterman**, whole colour, born June 9; *s.* Adonis 6456, *d.* Havering Buttercup 2nd (vol. xii.) *by* Montpellier 5249.

755 II. (£5.)—Col. H. McCalmont, M.P., Bishopswood, Ross, Herefordshire, for **Chanslor**, whole colour, born April 21; *s.* Chancellor 6500, *d* Lottie (vol. xi p. 280, imported) *by* Golden Fern's Lad 6236.

752 R. N. & H. C.—Joseph Brutton, Yeovil, for **Golden Star.**

H. C.—Mrs. Charlotte McIntosh, for No. 756, **Brompton**; W. Buckley Roderick, for No. 758, **Goodig Eminence.**

Com.—C. W. Armitage, for No. 749, **Foxy**; Earl Cadogan, K.G., for No. 753, **My Lord Conceit**; Lady de Rothschild, for No. 759, **Regulator**; G. Murray Smith, for No. 760, **Mont Orgeuil.**

Class 121.—*Jersey Cows (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [17 entries, 3 absent.]

775 I. (£15.)—Lady de Rothschild, Aston Clinton, Tring, Herts, for **Jolly Brown**, whole colour, born June 25, 1896, calved April 15, 1901, bred by Mrs. Le Sueur, Grouville, Jersey; *s.* Golden Lad 2nd 5177, *d.* Browny's Beauty (6325) P.S.H.C. *by* Morion 5295.

769 II. (£10.)—Mrs. Charlotte McIntosh, Havering Park, Essex, for **Emmeline** (7893) P.S H.C., fawn, born Nov. 10, 1897, calved May 13, 1901, bred by G. Le Cocq, Trinity, Jersey; *s* Golden Fern's Lad 6236, *d.* Rozel's Pet 4th (5288) P.S.C. *by* Distinction's Pride 4060.

777 III. (£5.)—G. Murray Smith, Gumley Hall, Market Harborough, for **Sultana** (vol. ix. p. 299), whole colour, born April 7, 1895, calved April 22, 1901, bred by Lord Rothschild, Tring Park, Herts; *s.* Spot's Lad 4389, *d.* Regina's Sultana (imported).

763 R. N. & H. C.—Joseph Brutton, Yeovil, for **Western Star.**

H. C.—C. W. Armitage, for No. 761, **Farineuse 3rd**; Mrs. C. McIntosh, for No. 770, **Linda**; Lady de Rothschild, for No. 774, **Carol**; G. Murray Smith, for No. 776, **La Chasse Camellia.**

Com.—Joseph Brutton, for No. 762, **Dulce**; Earl Cadogan, K.G., for No. 764, **Beatrice**, & No. 765, **Norah**; A. Miller-Hallett, for No. 772, **Mona 12th.**

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 122.—*Jersey Heifers (in-milk), calved in* 1899. [18 entries, 5 absent.]

778 I. (£15.)—Mrs. Walter Barron, Taplow House, Bucks, for **Rosette 5th**, fawn, born Jan. 25, calved April 7, 1901; *s.* Baron 5798, *d.* Rosette 2nd (vol. vi. p. 524) *by* Lord of the Isles 4612.

779 II. (£10.)—Joseph Brutton, 7 Prince's Street, Yeovil, for **Wild Buttercup**, grey, born April 1, calved May 16, 1901, bred by F. Le Brocq, St. Peter's, Jersey; *s.* Duplex 6538, *d.* Lady Maitland (6566) P.S.H.C. *by* Lord Maitland (1964).

789 III. (£5.)—Mrs. Charlotte McIntosh, Havering Park, Essex, for **Little May**, brown, born May 13, calved May 10, 1901, bred by T. Billot, St. Martin's, Jersey; *s.* Eminent 2nd 6546, *d.* Little Abbe (8491) F.S.C.

795 R. N. & H. C.—Edward Smith, for **Lady Harris**.

H. C.—Francis Le Brocq, for No. 785, **Laura 4th**; Col. H. McCalmont, M.P., for No. 787, **Desdemona**; Lady de Rothschild, for No. 793, **Wild Rose**.

Com.—Fowler & de la Perrelle, for No. 781, **Camelia 4th**, and No. 782, **Lizette 2nd**.

Class 123.—*Jersey Heifers, calved in* 1900. [18 entries, 7 absent.]

800 I. (£15.)—Earl Cadogan, K.G., Culford Hall, Bury St. Edmunds, for **Sunbeam**, broken colour, born March 15; *s.* Blucher 6141, *d.* Golden Streak (vol. x. p. 255) *by* Golden Fluke 4557.

798 II. (£10.)—Mrs. Walter Barron, Taplow House, Bucks, for **Lilian 9th**, grey, born May 31; *s.* Fearless 6548, *d.* Lilian (vol. ix. p. 248) *by* Lord of the Isles 4612.

805 III. (£5.)—Mrs. Charlotte McIntosh, Havering Park, Essex, for **Havering Glorissa 2nd**, fawn, born April 14; *s.* Havering Pride 6265, *d.* Glorissa 3rd (vol. ix. p. 224, imported) *by* Silver Grey 5725.

806 R. N. & H. C.—Mrs. Charlotte McIntosh, for **Zenobia 48th**.

H. C.—Col. H. McCalmont, M.P., for No. 804, **Bravura**; Lady de Rothschild, for No. 811, **Damsel**; Edward Smith, for No. 813, **Maisonette Fairy**.

Com.—Antony Gibbs, for No. 801, **Charity**, & No. 803, **Hope**; W.. Buckley Roderick, for No. 809, **Goodig Margery**.

Guernseys.

N.B.—Unless otherwise stated, the numbers refer to the English Guernsey Herd Book.

Class 124.—*Guernsey Bulls, calved in* 1897, 1898, *or* 1899. [8 entries, 2 absent.]

814 I. (£15.)—E. A. Hambro, Hayes Place, Hayes, Kent, for **Hayes Prince 1205**, fawn and white, born Nov. 1, 1899; *s.* Cobo Prince 1147, P.S., R.G.A.S., *d.* Silver Spade 4649 *by* Sly-of-the-Bordages 988, P.S., R G A.S.

820 II. (£10.)—H. M. Ozanne, Lilyvale, Castel, Guernsey, for **Harley of Chitral 1182**, P.S., R.G.A.S., pale red and white, born Feb. 24, 1899, bred by Capt. Le Cocq, St. George, Castel, Guernsey; *s.* Loyal of the Hunguets 978, P.S., R.G.A.S., *d.* May of St. George 3843, P.S., R.A.G.S.

816 III. (£5.)—Frank Hargreaves, Merton Grange, Gamlingay, for **Kimberley 1311**, fawn and white, born March 5, 1899, bred by H. M. Ozanne, Lilyvale, Castel, Guernsey; *s.* Massachusetts 293, F.S., R.G.A.S., *d.* Surahbi 4656 *by* Cogent 756, P.S., R.G.A.S.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

821 **R. N. & H. C.**—COL. H. W. SHAKERLEY, for **Captain Parry.**

Com.—MRS. MONTEFIORE, for No. 817, **Lord Bobs**; H. M. OZANNE, for No. 819, **Columbia.**

Class 125.—*Guernsey Bulls, calved in* 1900. [3 entries.]

824 I. (£10.)—MRS. MONTEFIORE, Worth Park, Crawley, Sussex, for **Signalman 5th 1349**, fawn and white, born July 3; *s.* Signalman 2nd 1048, *d.* Rose of Sharon 4273.

822 II. (£5.)—FOWLER AND DE LA PERRELLE, Southampton, for **Baden 1250,** P.S., R.G.A.S., pale red and white, born Feb. 2, bred by M. Tostevin, Guernsey; *s.* Proud Prince 1146, P.S., R.G.A.S., *d.* Aveline of the Simons 4519, P.S., R.G.A.S.

823 **R. N. & H. C.**—FRANK HARGREAVES, for **Merton Investigator.**

Class 126.—*Guernsey Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [8 entries, 2 absent.]

826 I. (£15.)—E. A. HAMBRO, Hayes Place, Hayes, Kent, for **Charmante of the Gron 3636**, pale red and white, born July 7, 1896, calved April 21, 1901, bred by J. Bourgaize, Gron, St. Saviour's, Guernsey; *s.* His Majesty 952, P.S., R.G.A.S., *d.* Charmante 5th 2619 P.S., R.G.A.S.

829 II. (£10.)—MRS. MONTEFIORE, Worth Park, Crawley, Sussex, for **Lily of the Forest 4540**, fawn and white, born March 29, 1898, calved April 2, 1901, bred by W. H. Lilian, St. Peter's Port, Guernsey; *s.* Nelson, *d.* Lily.

827 III. (£5.)—E. A. HAMBRO, for **Justinee** (vol. xv. p. 86), red and white, born June 4, 1895, calved April 28, 1901; *s.* Our Paradox 875, P.S., R.G.A.S., *d.* Justinee 1991, F.S., R.G.A.S.

828 **R. N. & Com.**—FRANK HARGREAVES, for **Sweet Sultan.**

831 **Com.**—H. M. OZANNE, for **Golden Cherry.**

Class 127.—*Guernsey Heifers, calved in* 1899. [7 entries, 3 absent.]

834 I. (£10.)—E. A. HAMBRO, Hayes Place, Kent, for **Claremont Jasmine 2nd 4390**, fawn and white, born March 24, bred by W. H. Fowler, Claremont, Taunton; *s.* Claremont Westward Ho 1091, *d.* Claremont Jasmine 4007.

836 II. (£5.)—MRS. MONTEFIORE, Worth Park, Crawley, for **Duchess of Essex 1st**, fawn & white, born Jan. 15, bred by H. M. Ozanne, Lilyvale, Castel, Guernsey; *s.* Nomadic 1236, *d.* Duchess of Essex 4219, P.S., R.G.A.S

837 **R. N.**—H. M. OZANNE, for **Gay Lass of Lilyvale.**

Class 128.—*Guernsey Heifers, calved in* 1900. [9 entries, 2 absent.]

845 I. (£10.)—MRS. MONTEFIORE, Worth Park, Crawley, for **Claremont Flora 4th 4739**, fawn and white, born June 6; *s.* Signalman 2nd 1048, *d.* Claremont Flora 3288.

840 II. (£5.)—E. A. HAMBRO, Hayes Place, Hayes, Kent, for **Claremont Hyacinth 2nd 4741**, fawn and white, born April 28, bred by W. H. Fowler, Claremont, Taunton; *s.* Klondyke 1066, P.S., R.G.A.S., *d.* Claremont Hyacinth 4740.

847 **R. N. & H. C.**—H. M. OZANNE, for **Sundari 18th.**

848 **H. C.**—COL. H. W. SHAKERLEY, for **Marie des Prevost.**

841 **Com.**—E. A. HAMBRO, for **Hayes Duchess.**

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Kerries.

N.B.—In the Kerry Classes, the number inserted within brackets after the name of an animal indicates the number of such animal in the Irish Kerry Herd Book. A number without brackets indicates that the animal is registered in the English Kerry Herd Book.

Class 129.—*Kerry Bulls, calved in* 1897, 1898, 1899, *or* 1900. [7 entries, 1 absent.]

854 **I. (£10.)**—J. Thorley, Ringdale House, Faringdon, Berks, for **Gilderoy**, born April 23, 1900, bred by C. B. Marlay, Belvedere House, Mullingar, Ireland; *s.* Cormac (407), *d.* Annie 3rd (2346).

849 **II. (£5.)**—Clifford J. Cory, Llantarnam Abbey, Newport, Mon., for **Llantarnam Lad** (476), born Feb. 19, 1900; *s.* Waterville Knight (368), *d.* Abbeyleix Prudence (2339) *by* Scariff (310).

851 **III. (£3.[1])**—Clifford J. Cory, for **Llantarnam Luck** (478), born June 29, 1900; *s.* Waterville Knight (368), *d.* Abbeyleix Norah 5th (2336) *by* King Conn (296).

850 **R. N. & H. C.**—Clifford J. Cory, for **Llantarnam Lord.**

853 **H. C.**—The Duchess of Newcastle, for **Hardwick General.**

Class 130.—*Kerry Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [6 entries, none absent.]

857 **I. (£10, & Champion.[2])**—Clifford J. Cory, Llantarnam Abbey, Newport, Mon., for **La Mancha Fan 38**, born 1896, calved April 22, 1901, breeder unknown.

861 **II. (£5.)**—J. Thorley, Ringdale House, Faringdon, Berks, for **Grenagh Laura 2356**, born 1895, calved March 17, 1901, breeder unknown.

860 **III. (£3.[1])**—The Duchess of Newcastle, Clumber, Worksop, for **Shamrock 2nd**, born April 3, 1896, calved Aug. 24, 1900; *s.* Kidmore Floral King (294), *d.* Shamrock (1180).

856 **R. N. & H. C.**—Clifford J. Cory, for **Abbeyleix Lady Clancarty.**

858 **H. C.**—Clifford J. Cory, for **La Mancha Turtle Dove.**

Class 131.—*Kerry Heifers, calved in* 1899 *or* 1900.[1] [5 entries, 1 absent.]

866 **I. (£10, & R. N. for Champion.[2])**—J. Thorley, Ringdale House, Faringdon, Berks, for **La Mancha Playful**, born April 3, 1899, bred by Robertson and Sons, Church Farm, Babraham, Cambs.

862 **II. (£5.)**—Clifford J. Cory, Llantarnam Abbey, Newport, Mon., for **Llantarnam Lady** (2776), born Nov. 23, 1899, bred by Viscount de Vesci, Abbeyleix, Ireland; *s.* Waterville Knight (368), *d.* Princess Alice (776) *by* Feale (8).

863 **III. (£3.)**—The Duchess of Newcastle, Clumber, Worksop, for **Hardwick Primrose**, born April 10, 1900; *s.* Swell (vol. ii.), *d.* Sheen 5th (vol. ii.) *by* The O'Dowd 112.

864 **R. N.**—The Duchess of Newcastle, for **Killarney 4th.**

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[1] Prize given by the English Kerry and Dexter Cattle Society.

[2] Challenge Cup, value Twenty-five Guineas (to become the property of an exhibitor winning it three years in succession), given by the English Kerry and Dexter Cattle Society for the best Kerry animal in Classes 129-131.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Dexters.

N.B.—In the Dexter Classes, the number inserted within brackets after the name of an animal indicates the number of such animal in the Irish Dexter Herd Book. A number without brackets indicates that the animal is registered in the English Dexter Herd Book.

Class 132.—*Dexter Bulls, calved in* 1897, 1898, 1899, *or* 1900. [12 entries, 2 absent.]

870 **I. (£10, & Champion.**[1]**)**—Norman C. Cookson, Oakwood, Wylam, R.S.O., for **La Mancha Union Jack** 37, red, born 1898, breeder unknown.

869 **II. (£5.)**—Baldomero de Bertodano, Cowbridge House, Malmesbury, for **La Mancha Good Lad**, red, born March, 1899, breeder unknown.

877 **III. (£3** [2]**)**—Mrs. Paisley, Waresley, Hunts, for **La Mancha C.I.V.** 113, black, born 1899, breeder unknown.

876 **R. N. & H. C.**—Mrs. E. A. Leatham, for **La Mancha Dick.**

H. C.—His Majesty the King, for No. 868, **Paddy**; William Stallard, for No. 878, **Malvern Signor.**

874 **Com.**—Lieut.-Gen. the Hon. S. J. Gough-Calthorpe, for **Tod Sloan.**

Class 133.—*Dexter Cows or Heifers (in-milk), calved in* 1895, 1896, 1897, *or* 1898. [12 entries, 1 absent.]

888 **I. (£10, & R. N. for Champion.**[1]**)**—Mrs. Paisley, Waresley, Hunts, for **Upminster Redskin** 256, red, born 1898, calved March 29, 1901, breeder unknown.

882 **II. (£5.)**—Baldomero de Bertodano, Cowbridge House, Malmesbury, for **Upminster Dainty Dish** 246, black, born 1897, calved April 11, 1901, breeder unknown.

884 **III. (£3.**[2]**)**—The Countess De La Warr, Manor House, Bexhill-on-Sea, for **Upminster Black Rose** 396, black, born May 13, 1898, calved March 12, 1901, bred by E. S. Woodiwiss, Westbury, Upminster, Essex; *s.* La Mancha Tom Thumb 81, *d.* Red Rose 234.

890 **R. N. & H. C.**—J. Thorley, for **Buckhurst White Heather.**

H. C.—His Majesty the King, for No. 880, **Busy Bee**; Baldomero de Bertodano, for No. 881, **La Mancha Nest Egg**; William Stallard, for No. 889, **Malvern Smart.**

887 **Com.**—H. Martin Gibbs, for **Irish Ivy.**

Class 134.—*Dexter Heifers, calved in* 1899 *or* 1900.[2] [12 entries, 1 absent.]

897 **I. (£10.)**—Lieut.-Gen. the Hon. S. J. Gough-Calthorpe, Perry Hall, Birmingham, for **Didn't Know** 494, black, born 1899, bred by Robertson and Sons, Church Farm, Babraham, Cambs.

898 **II. (£5.)**—Lieut.-Gen. the Hon. S. J. Gough-Calthorpe, for **Sweetheart** 552, red, born 1899, bred by Robertson and Sons, Church Farm, Babraham, Cambs.

901 **III. (£3.)**—William Stallard, Sunny Lodge, Malvern Link, for **Malvern Sign** (vol. ii.), black, born Feb. 7, 1899; *s.* Black Prince (290), *d.* Malvern Signature *by* Granddaddy (200).

900 **R. N. & H. C.**—Mrs. Paisley, for **La Mancha Modest Girl.**

H. C.—His Majesty the King, for No. 891, **Princess of Lisburne**; Norman C. Cookson, for No. 893, **La Mancha Wee Was**, and No. 894, **La Mancha Wee Wee**; William Stallard, for No. 902, **Malvern Smirk.**

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[1] Challenge Cup, value Twenty five Guineas (to become the property of an exhibitor winning it three years in succession), given by the English Kerry and Dexter Cattle Society for the best Dexter animal in Classes 132-134.

[2] Prizes given by the English Kerry and Dexter Cattle Society.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Dairy Cattle.

Class 135.—*Dairy Cows (in-milk), of any breed or cross.*
[6 entries, none absent.]

903 I. (£15.)—WILLIAM AKRIGG, White House Farm, Cressington, Liverpool, for **Beauty** (Shorthorn), roan, born Dec., 1895, calved June 11, 1901, breeder unknown.

908 II. (£10.)—JAMES THOMAS, The Dolan, Llanstephan, Carmarthenshire, for **Princess May** (vol. xliv. p. 530) (Shorthorn), roan, born Oct. 24, 1893, calved June 1, 1901, bred by the late W. S. Marsh, Penybedd, Burry Port; *s.* Field Marshal 2nd 60808, *d.* Salad 89th *by* Wild Duke of Rosedale.

904 III. (£5.)—THOMAS ATKINSON, Redvales Farm, Bury, Lancashire, for **Red Cherry** (Shorthorn), red and little white, born about 1896, calved June 1, 1901, breeder unknown.

906 **R. N. & H. C.**—JOHN EVENS, Burton, Lincoln, for **Burton Pansy.**

907 **H. C.**—COL. H. MCCALMONT, M.P., for **Sweet Wonder 2nd.**

SHEEP.

By "TWO-SHEAR" and "SHEARLING" are meant sheep born in 1899 and 1900, respectively.

Oxford Downs.

Class 136.—*Oxford Down Two-Shear Rams.*
[6 entries, none absent.]

910 I. (£10.)—JAMES T. HOBBS, Maisey Hampton, Fairford, Glos., born Feb.

914 II. (£5.)—J. & S. TREADWELL, Upper Winchendon, Aylesbury, for **Stirling**, born about Feb. 1; *s.* Bones 2783, *d. by* Young Plymouth 1831.

911 **R. N. & H. C.**—ROBT. W. HOBBS, Kelmscott, Lechlade, born about Feb. 1.

Class 137.—*Oxford Down Shearling Rams.* [18 entries, 2 absent.]

919 I. (£15.) & 920 II. (£10.)—JAMES T. HOBBS, Maisey Hampton, Fairford, Glos., born Feb.

915 III. (£5.)—ALBERT BRASSEY, M.P., Heythrop Park, Chipping Norton, Oxon, born Jan.; *s.* **Great Eastern 2084.**

929 **R. N. & H. C.**—HUGH W. STILGOE, born Jan. 17.
H. C.—ALBERT BRASSEY, M.P., for No. 917; J. & S. TREADWELL, for No. 932.
Com.—ALBERT BRASSEY, M.P., for No. 916; JAMES T. HOBBS, for No. 921; ROBERT W. HOBBS, for Nos. 922 & 923; J. & S. TREADWELL, for Nos. 930 & 931.

Class 138.—*Pens of Three Oxford Down Ram Lambs.*
[9 entries, 2 absent.]

939 I. (£10.)—W. J. P. READING, Rectory Farm, Langford, Lechlade, born about Jan. 15.

941 II. (£5.)—W. ALFRED TREWEEKE, Ryne Hill, Chipping Norton, Oxon, born Jan. 12, 15, 21.

936 **R. N. & H. C.**—ROBT. W. HOBBS, Kelmscott, Lechlade, born about Feb. 1.
H. C.—ALBERT BRASSEY, M.P., for No. 934; H. W. STILGOE, for No. 940.

Class 139.—*Pens of Three Oxford Down Shearling Ewes, of the same Flock.* [6 entries, none absent.]

942 I. (£15.)—ALBERT BRASSEY, M.P., Heythrop Park, Chipping Norton, Oxon, born Jan.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

945 **II.** (£10.) & 946 **III.** (£5.)—ROBERT W. HOBBS, Kelmscott, Lechlade, Glos., born about Feb. 1.

943 **R. N. & H. C**, & 944 **H. C.**—JOHN C. EADY, Irchester Grange, Wellingborough, born Feb. 12.

Class 140.—*Pens of Three Oxford Down Ewe Lambs.* [9 entries, 2 absent.]

956 **I.** (£10.)—W. ALFRED TREWEEKE, Ryne Hill, Chipping Norton, Oxon, born Jan. 18, 24, Feb. 6.

949 **II.** (£5.)—ALBERT BRASSEY, M.P., Heythrop Park, Chipping Norton, Oxon, born Jan.

955 **R. N. & H. C.**—HUGH W. STILGOE, born Feb. 1.

H. C.—ROBT. W. HOBBS, for No. 951; W. J. P. READING, for No. 954.

952 **Com.**—ROBERT W. HOBBS.

Shropshires.

Class 141.—*Shropshire Two-Shear Rams.* [10 entries, 6 absent.]

965 **I.** (£10.)—ANDREW E. MANSELL, Harrington Hall, Shifnal, born Feb.

960 **II.** (£5.)—P. A. & G. T. EVANS, Sherlowe, Wellington, Salop, born Feb.

963 **R. N. & H. C.**—JOHN HARDING, born March 20.

961 **H. C.**—THOMAS FENN.

Class 142.—*Shropshire Shearling Rams.* [29 entries, 5 absent.]

980 **I.** (£15.)—ANDREW E. MANSELL, Harrington Hall, Shifnal, born Feb.

971 **II.** (£10.)—R. P. COOPER, Ashlyns Hall, Berkhamsted, born Feb. 12.

992 **III.** (£5.)—BERNARD WALL, Hazlewood, Coleshill, born March.

972 **R. N. & H. C.**—P. A. & G. T. EVANS, Sherlowe, Wellington, Salop.

H. C.—MRS. MARIA BARRS, for No. 967; RICHARD P. COOPER, for No. 970; THOMAS FENN, for No. 974; JOHN HARDING, for No. 976; PHILO L. MILLS, for No. 982; ALFRED TANNER, for Nos. 989 & 990; BERNARD WALL, for Nos. 991 & 993.

Com.—W. F. INGE, for No. 978; ANDREW E. MANSELL, for No. 979; PHILO L. MILLS, for No. 981; EDWARD NOCK, for No. 987.

Class 143.—*Pens of Five Shropshire Shearling Rams.*[1] [13 entries, none absent.]

998 **I.** (£15.)—R P. COOPER, Ashlyns Hall, Berkhamsted, born March.

1003 **II.** (£10.)—ANDREW E. MANSELL, Harrington Hall, Shifnal, born Feb.

999 **III.** (£5.)—P. A. & G. T. EVANS, Sherlowe, Wellington, born Feb. & Mar.

1000 **R. N. & H. C.**—T. FENN, Stonebrook House, Ludlow, born about Mar. 15.

H. C.—MRS. MARIA BARRS, for No. 996; JOHN HARDING, for No. 1001; W. F. INGE, for No. 1002; PHILO L. MILLS, for No. 1004; THOMAS S. MINTON, for No. 1005; P. ALBERT MUNTZ, M.P., for No. 1006; EDWARD NOCK, for No. 1007; ALFRED TANNER, for No. 1008.

Class 144.—*Pens of Three Shropshire Ram Lambs.* [6 entries, 1 absent.]

1011 **I.** (£10.), & 1012 **R. N. & H. C.**—ANDREW E. MANSELL, Harrington Hall, Shifnal, Salop, born Feb.

1010 **II.** (£5.)—JOHN HARDING, Norton House, Shifnal, born Feb. and March.

H. C.—MRS. MARIA BARRS, for No. 1009; EDWARD NOCK, for No. 1013.

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[1] Prizes given by the Shropshire Sheep Breeders' Association.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 145.—*Pens of Three Shropshire Shearling Ewes, of the same Flock.* [12 entries, 1 absent.]

1022 **I.** (£15.)—P. A. Muntz, M.P., Dunsmore, Rugby, born Feb. and March.
1017 **II.** (£10.)—R. P. Cooper, Ashlyns Hall, Berkhamsted, born March.
1019 **III.** (£5.)—W. F. Inge, Thorpe Hall, Tamworth, born Feb.

1026 **R. N. & H. C.**—Bernard Wall, Hazelwood, Coleshill, born March.
H. C.—Mrs. Maria Barrs, for No. 1015; W. F. Inge, for No. 1020; Philo L. Mills, for No. 1021.
Com.—R. P. Cooper, for No. 1016; Edward Nock, for No. 1023.

Class 146.—*Pens of Three Shropshire Ewe Lambs.* [6 entries, 2 absent.]

1030 **I.** (£10.)—Andrew E. Mansell, Harrington Hall, Shifnal, born Feb.
1029 **II.** (£5.)—W. F. Inge, Thorpe Hall, Tamworth, born Jan.
1028 **R. N. & H. C.**—J. Harding, Norton House, Shifnal, born Feb. and Mar
1031 **H. C.**—Andrew E. Mansell.

Southdowns.

Class 147.—*Southdown Two-Shear Rams.* [16 entries, 5 absent.]

1046 **I.** (£10, & **Champion.**[1])—The Duke of Richmond and Gordon, K.G., Goodwood, Chichester, born Feb.
1035 **II.** (£5.)—Charles Adeane, Babraham Hall, Cambridge, born about Feb. 14.

1038 **R. N. & H. C.**—Earl Cadogan, K.G.
1045 **H. C.**—Pagham Harbour Co. 1044 **Com.**—Thomas Miles.

Class 148.—*Southdown Shearling Rams.* [27 entries, 4 absent.]

1053 **I.** (£15, & **R. N. for Champion.**[1])—Charles Adeane, Babraham Hall, Cambridge, born about Feb. 14.
1056 **II.** (£10.)—Earl Cadogan, K.G., Culford Hall, Suffolk, born March.
1049 **III.** (£5.)—His Majesty The King, Sandringham, born March.

1068 **R. N. & H. C.**—The Pagham Harbour Co., born about Feb. 15.
1071 **H. C.**—The Duke of Richmond and Gordon, K.G.
Com.—His Majesty The King, for No. 1051; Charles Adeane, for No. 1052; Earl Cadogan, K.G., for No. 1055; The Earl of Ellesmere, for No. 1061; Alfred Heasman, for No. 1063; Col. Harry McCalmont, M.P., for No. 1065.

Class 149.—*Pens of Three Southdown Ram Lambs.* [12 entries, 3 absent.]

1083 **I.** (£10.)—Col. Harry McCalmont, M.P., Cheveley Park, Newmarket, born Feb. 16.
1085 **II.** (£5.)—The Pagham Harbour Co., Selsey, Chichester, born about Feb. 15.

1077 **R. N. & H. C.**—Charles Adeane, born about Feb. 1.
1076 **H. C.**—His Majesty The King.

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[1] Champion Prize of £10 10s., given by the Southdown Sheep Society for the best Southdown Ram in Classes 147 and 148.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 150.—*Pens of Three Southdown Shearling Ewes, of the same Flock.* [9 entries, 3 absent.]

1089 I. (£15.)—EARL CADOGAN, K.G., Culford Hall, Bury St. Edmunds, born March.
1092 II. (£10.)—THE PAGHAM HARBOUR CO., Selsey, Chichester, born about Feb. 15.
1093 III. (£5.)—THE DUKE OF RICHMOND AND GORDON, K.G., Goodwood, Chichester, born Feb.

1090 **R. N. & H. C.**—JEREMIAH COLMAN, Gatton Park, Surrey, born Feb.

Class 151.—*Pens of Three Southdown Ewe Lambs.* [12 entries, 3 absent.]

1098 I. (£10.)—C. ADEANE, Babraham Hall, Cambridge, born about Feb. 1.
1100 II. (£5.)—JEREMIAH COLMAN, Gatton Park, Surrey, born Feb.

1105 **R. N. & H. C.**—THOMAS MILES, Buckwell, Wye, Kent, born Feb.
H. C.—COL. HARRY MCCALMONT, M.P., for No. 1104; THE PAGHAM HARBOUR CO., for No. 1106.
1097 **Com.**—HIS MAJESTY THE KING.

Hampshire Downs.

Class 152.—*Hampshire Down Two-Shear Rams.* [10 entries, 2 absent.]

1115 I. (£10, & **R. N. for Champion.**[1])—JAMES FLOWER, Chilmark, Salisbury, born Jan.
1110 II. (£5.)—T. FOWELL BUXTON, Waters Place, Ware, Herts, born Jan.

1116 **R. N. & H. C.**—LORD ROTHSCHILD, Tring Park, Herts, for **Goldsmith.**
1112 **H. C.**—CARY COLES. 1114 **Com.**—JAMES FLOWER.

Class 153.—*Hampshire Down Shearling Rams.* [18 entries, 6 absent.]

1129 I. (£15, & **Champion.**[1])—JAMES FLOWER, Chilmark, Salisbury, born Feb.
1123 II. (£10.)—THE EARL OF CARNARVON, Highclere Castle, Newbury, born about Jan. 14.
1132 III. (£5.)—LORD ROTHSCHILD, Tring Park, Herts, born about Jan. 10.

1128 **R. N & H. C.**—JAMES FLOWER, Chilmark, Salisbury, born Jan.
Com.—T. FOWELL BUXTON, for No. 1120; CARY COLES, for No. 1126.

Class 154.—*Pens of Three Hampshire Down Ram Lambs* [13 entries, 2 absent.]

1141 I. (£10.)—JAMES FLOWER, Chilmark, Salisbury, born about Jan. 20.
1138 II. (£5.)—T. FOWELL BUXTON, Waters Place, Ware, Herts, born Jan.

1139 **R. N. & H. C.**—THE EARL OF CARNARVON, born about Jan. 10.
H. C.—CARY COLES, for No. 1140; LORD ROTHSCHILD, for No. 1147; CHARLES A. SCOTT-MURRAY, for No. 1148.
Com.—ALEXANDER HENDERSON, M.P., for No. 1144; SIR J. BLUNDELL MAPLE, BT., M.P., for No. 1145; H. C. STEPHENS, for No. 1149.

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[1] Champion Prize of £10, given by the Hampshire Dow Sheep Breeders' Association, for the best Two-Shear or Shearling Ram in Classes 152 and 153.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 155.—*Pens of Three Hampshire Down Shearling Ewes, of the same Flock.* [9 entries, 2 absent.]

1151 **I.** (£15, & **R. N.** for Champion[1]) & 1150 **II.** (£10.)—JAMES FLOWER Chilmark, Salisbury, born Jan.
1157 **III.** (£5.), & 1156 **R. N. & H. C.**—C. A. SCOTT-MURRAY, The Manor House, Hambleden, Henley-on-Thames, born Jan.
1154 **Com.**—SIR J. BLUNDELL MAPLE, BT., M.P.

Class 156.—*Pens of Three Hampshire Down Ewe Lambs.* [11 entries, 1 absent.]

1161 **I.** (£10, & **Champion.**[1])—THE EARL OF CARNARVON, Highclere Castle, Newbury, born about Jan. 14.
1165 **II.** (£5.)—ALEXANDER HENDERSON, M.P., Buscot Park, Faringdon, Berks, born Jan. 10.
1160 **R. N. & H. C.**—T. FOWELL BUXTON, Waters Place, Ware, Herts, born Jan.
H. C.—LLOYD H. BAXENDALE, for No. 1159; CARY COLES, for No 1162; JAMES FLOWER, for No. 1163; C. A. SCOTT-MURRAY, for No. 1168.
1169 **Com.**—HENRY C. STEPHENS.

Suffolks.

Class 157.—*Suffolk Two-shear Rams.* [6 entries, 1 absent.]

1175 **I.** (£10, & **Champion.**[2])—HERBERT E. SMITH, The Grange, Walton, Suffolk, born Feb.
1172 **II.** (£5.)—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket, born Feb.
1170 **R. N. & H. C.**—MAJOR E. W. BAIRD, for **Gunner of Stetchworth.**

Class 158.—*Suffolk Shearling Rams.* [8 entries, 2 absent.]

1182 **I.** (£15, & **R. N.** for **Champion.**[2])—HERBERT E. SMITH, The Grange, Walton, Suffolk, born Feb.
1177 **II.** (£10.) & 1178 **III.** (£5.)—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket, born Feb.
1183 **R. N. & H. C.**—HERBERT E. SMITH, Walton, born Feb.

Class 159.—*Pens of Three Suffolk Ram Lambs.* [6 entries, 1 absent.]

1189 **I.** (£10.)—HERBERT E. SMITH, The Grange, Walton, Suffolk, born Feb.
1186 **II.** (£5.)—T. GOODCHILD, Great Yeldham Hall, Halstead, born Jan.
1188 **R. N. & H. C.**—SAMUEL ROBERT SHERWOOD, born Feb.

Class 160.—*Pens of Three Suffolk Shearling Ewes, of the same Flock.* [3 entries.]

1191 **I.** (£15.) & 1192 **II.** (£10.)—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket, born Feb.
1190 **R. N. & H. C.**—MAJOR E. W. BAIRD, born Feb.

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[1] Champion Prize of £10, given by the Hampshire Down Sheep Breeders' Association, for the best Pen of Shearling Ewes or of Ewe Lambs in Classes 155 and 156.
[2] Champion Gold Medal, given by the Suffolk Sheep Society, for the best Suffolk Ram in Classes 157 and 158.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 161.—*Pens of Three Suffolk Ewe Lambs.* [6 entries, 1 absent.]

1195 **I.** (**£10.**)—T. Goodchild, Great Yeldham Hall, Halstead, born Jan. & Feb.
1197 **II.** (**£5.**)—Samuel Robert Sherwood, Playford, Ipswich, born Feb.
1198 **R. N. & H. C.**—Herbert E. Smith, The Grange, Walton, born Feb.
1194 **H. C.**—The Earl of Ellesmere..

Somerset and Dorset Horned.

Class 162.—*Somerset and Dorset Horned Shearling Rams, dropped after November* 1, 1899. [4 entries, none absent.]

1200 **I.** (**£10.**)—Leonard Cole Attrill, Bowcombe Farm, Carisbrooke, Isle of Wight, for **Bowcombe No. 15**, born Dec. 14, 1899.
1199 **II.** (**£5.**)—Leonard Cole Attrill, for **Bowcombe No. 14**, born about Dec. 25, 1899.

1202 **R. N.**—William Reginald Flower, for **Flower's No. 81.**

Class 163.—*Pens of Three Somerset and Dorset Horned Shearling Ewes, of the same Flock, dropped after November* 1, 1899. [4 entries, none absent.]

1204 **I.** (**£10.**)—W. R. Flower, West Stafford, Dorchester, born Dec. 1, 1899.
1203 **II.** (**£5.**)—Leonard Cole Attrill, Bowcombe Farm, Carisbrooke, Isle of Wight, born Nov. and Dec., 1899.

1206 **R. N.**—Frank J. Merson, born December, 1899.

Lincolns.

Class 164.—*Lincoln Two-Shear Rams.* [7 entries, 2 absent.]

1207 **I.** (**£10, & Champion.**[1])—J. E. Casswell, Laughton, Folkingham, Lincs. for **Laughton Ringleader**, born about Feb. 7.
1208 **II.** (**£5.**)—S. E. Dean and Sons, Dowsby Hall, Bourne, Lincs., for **Dowsby Double Dumpling**, born in Feb.

1210 **R. N. & H. C.**—Henry Dudding, born about Feb. 20.
1211 **H. C.**—John Pears.

Class 165.—*Lincoln Shearling Rams.* [18 entries, 6 absent.]

1231 **I.** (**£15, & R. N. for Champion.**[1])—R. & W. Wright, Nocton Heath, Lincoln, born March.
1219 **II.** (**£10.**)—S. E. Dean & Sons, Dowsby Hall, Bourne, Lincs, born Feb.
1215 **III.** (**£5.**)—J. E. Casswell, Laughton, Folkingham, born about Feb. 7.

1217 **R. N. & H. C.**—Tom Casswell, Pointon, Folkingham, born about Feb. 20.
H C.—Henry Dudding, for No. 1221; John Pears, for No. 1225.
Com.—J. E. Casswell, for No. 1216; R. and W. Wright, for No. 1230.

Class 166.—*Pens of Five Lincoln Shearling Rams.*[2] [7 entries, 1 absent.]

1234 **I.** (**£15.**)—Tom Casswell, Pointon, Folkingham, Lincs, born Feb.
1235 **II.** (**£10.**)—S. E. Dean & Sons, Dowsby Hall, Bourne, Lincs, born Feb.
1236 **III.** (**£5.**)—Henry Dudding, Riby Grove, Gt. Grimsby, born Feb. 24.

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[1] Champion Prize of £10 10*s*., given by the Lincoln Long-Wool Sheep Breeders' Association, for the best Lincoln Ram in Classes 164 and 165.

[2] Prizes given by the Lincoln Long-Wool Sheep Breeders' Association.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

1238 **R. N. & H. C.**—R. & W. Wright, Nocton Heath, Lincoln, born March.
1233 **H. C.**—J. E. Casswell.

Class 167.—*Pens of Three Lincoln Ram Lambs.* [6 entries, 1 absent.]

1244 **I.** (£10.)—R. & W. Wright, Nocton Heath, Lincoln, born March.
1243 **II.** (£5.)—John Pears, Mere, Lincoln, born Feb.

1239 **R. N.**—S. E. Dean & Sons, Dowsby Hall, Bourne, Lincs, born Jan.

Class 168.—*Pens of Three Lincoln Shearling Ewes, of the same Flock.* [6 entries, 1 absent.]

1249 **I.** (£15.) & 1250 **III.** (£5.)—R. & W. Wright, Nocton Heath, Lincoln, born March.
1247 **II.** (£10.)—Henry Dudding, Riby Grove, Great Grimsby, born Feb. 22.
1245 **R. N. & H. C.**—S. E. Dean & Sons, Dowsby Hall, Bourne, born Feb.
1248 **H. C.**—John Pears.

Class 169.—*Pens of Three Lincoln Ewe Lambs.* [5 entries, none absent.]

1255 **I.** (£10.)—R. & W. Wright, Nocton Heath, Lincoln, born March.
1254 **II.** (£5.)—John Pears, Mere, Lincoln, born Jan.
1252 **R. N.**—S. E. Dean & Sons, Dowsby Hall, Bourne, born Jan.

Leicesters.

Class 170.—*Leicester Shearling Rams.* [8 entries, none absent.]

1256 **I.** (£15.) & 1258 **II.** (£10.)—George Harrison, Gainford Hall, Darlington, born Feb. or March.
1259 **III.** (£5.) & 1261 **R. N. & H. C.**—E. F. Jordan, Eastburn, Driffield, born March.
1257 **H. C.**—George Harrison.
1263 **Com.**—Executors of the late John J. Simpson.

Class 171.—*Pens of Three Leicester Ram Lambs.* [3 entries.]

1264 **I.** (£10.)—George Harrison, Gainford Hall, Darlington, born March.
1265 **II.** (£5.)—Ernest Francis Jordan, Eastburn, Driffield, born March.
1266 **R. N. & H. C.**—Executors of the late John J. Simpson, born Feb.

Class 172.—*Pens of Three Leicester Shearling Ewes, of the same Flock.* [6 entries.]

1269 **I.** (£15.) & 1270 **R. N. & H. C.**—Ernest Francis Jordan, Eastburn, Driffield, born March.
1268 **II.** (£10.) & 1267 **III.** (£5.)—George Harrison, Gainford Hall, Darlington, born Feb. or March.
1272 **H. C.** & 1271 **Com.**—Executors of the late John J. Simpson.

Class 173.—*Pens of Three Leicester Ewe Lambs.* [3 entries.]

1274 **I.** (£10.)—Ernest Francis Jordan, Eastburn, Driffield, born March.
1273 **II.** (£5.)—George Harrison, Gainford Hall, Darlington, born March.
1275 **R. N. & H. C.**—Executors of the late John J. Simpson, born Feb.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Cotswolds.

Class 174.—*Cotswold Shearling Rams.* [8 entries, none absent.]

1277 I. (£15.) & 1278 III. (£5.)—W. T. GARNE, Aldsworth, Northleach, R.S.O., Glos, born Jan., bred by R. and W. T. Garne, Aldsworth, Northleach.
1281 II. (£10.)—RUSSELL SWANWICK, Royal Agricultural College Farm, Cirencester, Glos, born Jan.
1280 R. N. & H. C.—WILLIAM HOULTON, born Jan.
1276 H. C.—W. T. GARNE.

Class 175.—*Pens of Three Cotswold Ram Lambs.* [6 entries, 1 absent.]

1284 I. (£10.)—W. T. GARNE, Aldsworth, Northleach, born about Jan. 20.
1285 II. (£5.)—W. T. GARNE, born about Feb. 1.
1286 R. N. & H. C., & 1287 H. C.—RUSSELL SWANWICK, Royal Agricultural College Farm, Cirencester, Glos, born Jan.

Class 176.—*Pens of Three Cotswold Shearling Ewes, of the same Flock.* [8 entries, 1 absent.]

1290 I. (£15.), & 1291 II. (£10.)—W. T. GARNE, Aldsworth, Northleach, R.S.O. Glos, born Jan., bred by R. and W. T. Garne, Aldsworth, Northleach.
1293 III. (£5.)—W. HOULTON, Broadfield Farm, Northleach, R.S.O., born Jan.
1295 R. N. & H. C.—RUSSELL SWANWICK, born Jan.

Class 177.—*Pens of Three Cotswold Ewe Lambs.* [4 entries, none absent.]

1298 I. (£10.)—W. T. GARNE, Aldsworth, Northleach, R.S.O., Glos, born about Jan. 20, bred by R. and W. T. Garne, Aldsworth, Northleach.
1299 II. (£5.)—RUSSELL SWANWICK, Royal Agricultural College Farm, Cirencester, born Jan.
1301 R. N.—WM. THOMAS, The Hayes, Sully, Barry, Glam., born about Jan. 10.

Border Leicesters.

Class 178.—*Border Leicester Shearling Rams.* [9 entries, 1 absent.]

1307 I. (£15.)—JOHN TWENTYMAN, Hawkrigg House, Wigton, born Mar. 20.
1305 II. (£10.)—MESSRS. NICHOLSON, Manor House, Lanchester, co. Durham, born March 20.
1308 III. (£5.)—JOHN TWENTYMAN, born March 24.
1302 R. N. & H. C. & 1303 Com.—THE RT. HON. A. J. BALFOUR, M.P.

Class 179.—*Pens of Three Border Leicester Ram Lambs.* [4 entries, none absent.]

1311 I. (£10.)—THE RT. HON. A. J. BALFOUR, M.P., Whittingehame, Prestonkirk, N B., born March 15, 18 and 20.
1312 II. (£5.)—MESSRS. NICHOLSON, Manor House, Lanchester, co. Durham, born March 15, 21 and 26.
1313 R. N. & H. C.—J. TWENTYMAN, Hawkrigg House, Wigton, born March.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 180.—*Pens of Three Border Leicester Shearling Ewes, of the same Flock.* [5 entries, 1 absent.]

1315 **I. (£15.)**—The Rt. Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk, N.B., born March 10, 13 and 16.

1316 **II. (£10.)**—Messrs. Nicholson, Manor House, Lanchester, co. Durham, born March 14, 17 and 29; *s.* The Gentleman.

1318 **III. (£5.)**—John Twentyman, Hawkrigg House, Wigton, born March.

1319 **R. N. & Com.**—Thos. Winter, Lotherton Park, Aberford, Leeds, born Mar.

Class 181.—*Pens of Three Border Leicester Ewe Lambs.* [4 entries, none absent.]

1320 **I. (£10.)**—The Rt. Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk, N.B., born March 8, 17 and 22.

1321 **II. (£5.)**—Messrs. Nicholson, Manor House, Lanchester, co. Durham born March 28, 29 and 30; *ss.* Markle Prince and Mayor of Maidstone.

1322 **R. N. & H. C.**—John Twentyman, born Feb. and March.

Kentish or Romney Marsh.

Class 182.—*Kentish or Romney Marsh Shearling Rams.* [8 entries, 2 absent.]

1325 **I. (£10.), & 1326 II. (£5.)**—Charles File, Elham, Canterbury, Kent, born April 1.

1328 **R. N. & H. C.**—William Millen, born March 26.

Class 183.—*Pens of Three Kentish or Romney Marsh Shearling Ewes, of the same Flock.* [7 entries, 1 absent.]

1333 **I. (£10.), & 1334 R. N. & H. C.**—Charles File, Elham, Canterbury, born April 1.

1335 **II. (£5.)**—William Millen, Syndale Valley, Faversham, born about March 26.

1336 **H. C.**—Frederick Neame, Macknade, Faversham, born about March 18.
Com.—Frederick Neame, for No. 1337; J. E. Quested, for No. 1338.

Wensleydales.

Class 184.—*Wensleydale Shearling Rams.* [6 entries, none absent.]

1344 **I. (£10.)**—The Exors. of the late T. Willis, Manor House, Carperby, Aysgarth, born March 27; *s.* Royal Maidstone 582, *d. by* Sensation 353.

1343 **II. (£5.)**—The Exors. of the late T. Willis, born April, bred by Wm. Rhodes, Lundholme, Westhouse, Kirkby Lonsdale; *s.* Marengo 499, *d. by* True Blue 233.

1339 **R. N. & H. C.**—Lord Henry Bentinck, M.P., for Blue Royal.

1341 **H.C.**—James Rhodes.

Class 185.—*Pens of Three Wensleydale Shearling Ewes, of the same Flock.* [7 entries, 1 absent.]

1351 **I. (£10.)**—The Exors. of the late T. Willis, Manor House, Carperby, Aysgarth, born March; *s.* Royal Maidstone 582, *ds. by* Sensation 353 and Harrogate Lad 433.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

1350 **II.** (*£5.*)—THE EXORS. OF THE LATE T. WILLIS, born March; *ss.* Royal Maidstone 582 and Royal Record 510, *ds. by* Lord of the Valley 109 and Ruler of the Valley 402.

1346 **R. N. & H. C.**—LORD HENRY BENTINCK, M.P., born Feb. 12, 22 and Mar. 15.

1349 **H. C.**—JAMES RHODES.

Devon Long-Woolled.

Class 186.—*Devon Long-Woolled Shearling Rams.* [4 entries.]

1355 **I.** (*£10.*)—FREDERICK WHITE, Torweston, Williton, Somerset, born Feb.

1353 **II.** (*£5.*)—ALFRED C. SKINNER, Pound Farm, Bishop's Lydeard, born about Feb. 1.

1354 **R. N. & H. C.**—FREDERICK WHITE, Torweston, born Feb.

1352 **Com.**—ALFRED C. SKINNER.

Class 187.—*Pens of Three Devon Long-Woolled Ram Lambs.*[1] [3 entries.]

1357 **I.** (*£7.*), & 1356 **R. N. & H. C.**—ALFRED C. SKINNER, Pound Farm, Bishop's Lydeard, born about Feb. 1.

1358 **II.** (*£3.*)—FREDERICK WHITE, Torweston, Williton, Somerset, born Feb.

Class 188.—*Pens of Three Devon Long-Woolled Shearling Ewes, of the Same Flock.* [2 entries.]

1359 **I.** (*£10.*), & 1360 **II.** (*£5.*)—FREDERICK WHITE, Torweston, Williton, Somerset, born Feb.

Dartmoors.

Class 189.—*Dartmoor Shearling Rams.* [4 entries.]

1364 **I.** (*£10.*)—WARD & CHOWEN, Burnville, Tavistock, born March 10.

1362 **II.** (*£5.*)—JOHN R. T. KINGWELL, Great Aish, South Brent, Devon, for **Massive**, born March 1; *s.* Drew, *d by* Flat Face.

1363 **R. N. & H. C.**—WARD & CHOWEN, born March 4.

1361 **Com.**—JOHN R. T. KINGWELL.

Class 190.—*Pens of Three Dartmoor Shearling Ewes, of the same Flock.* [4 entries, none absent.]

1367 **I.** (*£10.*)—WARD & CHOWEN, Burnville, Tavistock, born March 8.

1366 **II.** (*£5.*)—JOHN R. T. KINGWELL, Great Aish, South Brent, Devon, born March; *s.* Champion.

1368 **R. N.**—WARD & CHOWEN, born March 5.

Exmoors.

Class 191.—*Exmoor Shearling Rams.* [2 entries.]

1370 **I.** (*£10.*)—CHARLES N. SKINNER, Hawkhurst, Bridgwater, born April 15.

1369 **R. N. & H. C.**—CHARLES N. SKINNER, born April 10.

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[1] Prizes given by the Devon Long-Woolled Sheep Breeders' Society.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 192.—*Pens of Three Exmoor Shearling Ewes, of the same Flock.* [2 entries.]

1372 I. (£10.), & 1371 II. (£5.)—CHARLES N. SKINNER, Hawkhurst, Bridgwater, born April 1.

Cheviots.

Class 193.—*Cheviot Rams: Shearlings and upwards.* [4 entries.]

1376 I. (£10.)—JOHN ROBSON, Newton, Bellingham, born March 1899.
1373 II. (£5.)—JACOB ROBSON, Byrness, Otterburn, born April 1899.

1375 **R. N. & Com.**—JOHN ROBSON, born March 1900.
1374 **Com.**—JACOB ROBSON.

Class 194.—*Pens of Three Cheviot Shearling Ewes, of the same Flock.* [3 entries.]

1379 I. (£10.)—JOHN ROBSON, Newton, Bellingham, born March.
1377 II. (£5.), & 1378 **R. N. & Com.**—JACOB ROBSON, Byrness, born April.

Black-Faced Mountain.

Class 195.—*Black-Faced Mountain Rams: Shearlings and upwards.* [3 entries.]

1380 I. (£10.)—THE EXORS. OF THE LATE T. DARGUE, Burneside Hall, Kendal, Westmorland, for **Barnum**, born April 1898, bred by Mr. Fleming, Threepland, Lanark.
1381 II. (£5.)—JOHN ROBSON, Newton, Bellingham, born March 1899.

1382 **R. N. & H. C.**—JOHN ROBSON, born March 1900.

Class 196.—*Pens of Three Black-Faced Mountain Shearling Ewes, of the same Flock.* [3 entries.]

1384 I. (£10.)—JOHN ROBSON, Newton, Bellingham, born March.
1383 II. (£5.)—THE EXORS. OF THE LATE T. DARGUE, Burneside Hall, Kendal, born April 15, 18, and 26; *s.* Barnum.

1385 **R. N. & H. C.**—JOHN ROBSON, born April.

Herdwicks.

Class 197.—*Herdwick Rams: Two-Shears and upwards.* [4 entries.]

1387 I. (£10.)—WILLIAM LEATHES, Wern Fawr, Ruthin, for **Young Snowdon**, born March 1899.
1388 II. (£5.)—WILLIAM MACKERETH, Green Bank Farm, Ambleside, for **Bloom**, born April 12, 1899; *s.* Bloomer, *d.* Queen.

1386 **R. N. & H. C.**—WILLIAM LEATHES, for **Rover**.
1389 **Com.**—JOHN ROBSON.

Class 198.—*Pens of Three Herdwick Shearling Ewes, of the same Flock.* [4 entries.]

1392 I. (£10.), & 1391 II. (£5.)—WILLIAM MACKERETH, Green Bank Farm, Ambleside, born April 6.

1390 **R. N. & H. C.**—WILLIAM LEATHES, born March and April.
1393 **Com.**—JOHN ROBSON.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Welsh Mountain.

Class 199.—*Welsh Mountain Three-Shear Rams.*[1] [7 entries, 1 absent.]

1394 **I.** (£10.)—W. Conwy Bell, Bryn-y-ffynon, Rhuddlan, born March.
1399 **II.** (£5.)—William Leathes, Wern Fawr, Ruthin, for **Young Taffy**, born March, bred by Colonel Platt, Gorddinog, Llanfairfechan.

1397 **R. N. & H. C.**—R. M. Greaves, Wern, Portmadoc, for **Bychan.**
1395 **H. C.**—W. Conwy Bell. 1398 **Com.**—R. M. Greaves.

Class 200.—*Welsh Mountain Two-Shear Rams.* [6 entries, 1 absent.]

1405 **I** (£10.)—Owen Price, Nantyrharn, Cray, Brecon, for **Twm or Nant**, born March 12, bred by W. E. Williams, Gwerclas, Corwen.
1402 **II.** (£5.), & 1401 **R. N. & H. C.**—W. Conwy Bell, Bryn y-ffynon, Rhuddlan, born March.
1404 **H. C.**, & 1403 **Com.**—J. Marshall Dugdale.

Class 201.—*Pens of Three Welsh Mountain Shearling Ewes, of the same Flock.* [7 entries, 1 absent.]

1411 **I.** (£10.)—Mrs. Anne Gratton, Foryd Fawr Farm, Abergele, Denbighshire, born Feb. and March.
1408 **II.** (£5.), & 1407 **R. N. & H. C.**—W. Conwy Bell, Bryn-y-ffynon, Rhuddlan, born March.

1412 **H. C.**—Owen Price. 1409 **Com.**—J. Marshall Dugdale.

Ryelands.

Class 202.—*Ryeland Shearling Rams.*[1] [6 entries, 1 absent.]

1415 **I.** (£10.)—W. T. Barneby, Saltmarshe Castle, Bromyard, born March; *s.* The Guy.
1416 **II.** (£5.), & 1417 **R. N. & H. C.**—F. Elliott Gough, The Moor, Bodenham, Leominster, born March 12.
1414 **H. C.**—W. T. Barneby.

Class 203.—*Pens of Three Ryeland Shearling Ewes, of the same Flock.*[1] [5 entries, none absent.]

1420 **I.** (£10.), & 1421 **II.** (£5.)—W. T. Barneby, Saltmarshe Castle, Bromyard, born March; *ss.* Slowcoach and The Guy.

1423 **R. N. & H.C.**—F. Elliott Gough, born March 20.
1422 **H C.**—W. H. Davies.

Radnors.

Class 204.—*Pens of Three Radnor Shearling Ewes, of the same Flock.*[1] [3 entries, none absent.]

1426 **I.** (£10.), & 1427 **II.** (£5.)—W. W. Ricketts & Sons, Trebarried, Talgarth, Breconshire, born March.

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[1] Prizes given by the Cardiff Local Committee.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

PIGS.

Large White Breed.

Class 205.—*Large White Boars, farrowed in* 1899 *or* 1900. [7 entries, 1 absent.]

1428 I. (£10, & Champion.[1])—Sir Gilbert Greenall, Bt., Walton Hall, Warrington, for **Walton Laddie 6075**, born June 24, 1899; *s.* Walton Turk 5241, *d.* Walton Belle III. 6778 *by* Walton Eclipse 3621.

1434 II. (£5.)—Sanders Spencer, Holywell Manor, St. Ives, Hunts, for **Holywell Hugh**, born July 17, 1899; *s.* Holywell Dismal Jimmy, *d.* Holywell Star *by* Holywell Dublin.

1430 III. (£3.)—Philo L. Mills, Ruddington Hall, Notts, for **Ruddington Manor**, born Sept. 18, 1899; *s.* Ruddington King David 5th 3143, *d.* Miss Hollingworth 64th 8094 *by* Borrowfield Gamester 3405.

1432 R. N. & H. C.—Herbert H. Owtram, for **Newland Shakespeare.**

Class 206.—*Pens of Three Large White Boar Pigs, farrowed in* 1901. [10 entries, 1 absent.]

1437 I. (£10.)—Daniel R. Daybell, Bottesford, Nottingham, born Jan. 4; *s.* Bottesford Long Sam 5893, *d.* Bottesford Queen 13th 10152 *by* Bottesford Rufford 3903.

1444 II. (£5.)—Sanders Spencer, Holywell Manor, St. Ives, Hunts, born Jan. 16 and 19; *ss.* Holywell Emperor II. and Holywell Emperor, *ds.* Holywell Gigasoline *by* Holywell Gigas 5107 and Holywell Tabs *by* Holywell Elephant.

1443 III. (£3.)—Sanders Spencer, born Jan. 11 and 13; *s.* Holywell Elephant, *ds.* Holywell Kathleen V. *by* Holywell Dublin and Holywell Genevra *by* Holywell Dismal Jimmy.

1440 R. N. & H. C.—Philo L. Mills, Ruddington Hall, Notts, born Jan. 2.

Com.—Nathaniel Benjafield, for No. 1435; Daniel R. Daybell, for No. 1436.

Class 207.—*Large White Breeding Sows, farrowed in* 1897, 1898, 1899 *or* 1900. [7 entries, none absent.]

1448 I. (£10, & R. N. for Champion [1])—Sir Gilbert Greenall, Bt., Walton Hall, Warrington, for **Sowerby Beauty 9690**, born Jan. 1, 1899 [farrowed Aug. 11, 1901], bred by Richard Stuart, Brook Vale, Sowerby, Garstang; *s.* Borrowfield Lad IX. 4623, *d.* Bryers Beauty 8642 *by* Walton Topsman 3623.

1446 II. (£5.)—Daniel R. Daybell, Bottesford, Nottingham, for **Bottesford Perfection 8634**, born Jan. 25, 1898 [farrowed Aug. 28, 1901]; *s.* Bottesford Rufford 3903, *d.* Bottesford Expectation 7930 *by* Bottesford King 3019.

1445 III. (£3.)—Daniel R. Daybell, for **Bottesford Model 8632**, born Feb. 12, 1898 [farrowed Aug. 22, 1901]; *s.* Bottesford Rufford 3903, *d.* Bottesford Lady III. 6492 *by* Borrowfield King 1235.

1451 R. N. & H. C.—Sanders Spencer, for **Holywell Czarina.**

1450 Com.—Herbert H. Owtram, for **Newland Sunlight.**

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[1] Champion Gold Medal, value £5 5*s*., given by the National Pig Breeders' Association, for the best Large White Boar or Sow in Classes 205 and 207.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 208.—*Pens of Three Large White Sow Pigs, farrowed in* 1901. [10 entries, 3 absent.]

1452 **I.** (£10.)—DANIEL R. DAYBELL, Bottesford, Nottingham, born Jan. 3; *s.* Bottesford Long Sam 5893, *d.* Bottesford Queen XII. 10150 *by* Bottesford Rufford 3903.

1456 **II.** (£5.)—PHILO L. MILLS, Ruddington Hall, Notts, born Jan. 14; *s.* Mafeking 5991, *d.* Miss Hollingworth 68th 9588 *by* Ruddington King David VIII. 4031.

1460 **III.** (£3.)—SANDERS SPENCER, Holywell Manor, St. Ives, Hunts, born Jan. 11; *s.* Holywell Elephant 5103, *d.* Holywell Kathleen V. *by* Holywell Dublin 2681.

1459 **R. N. & H. C.**—H. H. OWTRAM, Newland Hall, Ellel, Lancaster, born Jan. 4.

1454 **Com.**—SIR GILBERT GREENALL, BT.

Middle White Breed.

Class 209.—*Middle White Boars, farrowed in* 1899 *or* 1900. [6 entries, 2 absent.]

1465 **I.** (£10, & **R. N.** for Champion.[1])—SIR GILBERT GREENALL, BT., Walton Hall, Warrington, for **Walton John**, born March 6, 1899; *s.* Walton Surprise 4175, *d.* Walton Bridesmaid II. 9112 *by* Walton Editor 4499.

1466 **II.** (£5.)—SANDERS SPENCER, Holywell Manor, St. Ives, Hunts, for **Holywell Rosador**, born Jan. 14, 1899; *s.* Holywell Stumpy Tail 4479, *d.* Holywell Rosy Girl *by* Holywell Count 3239.

1467 **R. N. & H. C.**—ALFRED C. TWENTYMAN, for **Castlecroft Claudius.**

Class 210.—*Pens of Three Middle White Boar Pigs, farrowed in* 1901. [4 entries, none absent.]

1471 **I.** (£10.)—SANDERS SPENCER, Holywell Manor, St. Ives, Hunts, born Jan. 10; *s.* Holywell Count Curly 5713, *d.* Holywell Rosadora *by* Holywell Stumpy Tail 4479.

1468 **II.** (£5.)—SIR GILBERT GREENALL, BT., Walton Hall, Warrington, born Jan. 3; *s.* Walton Andrew 6167, *d.* Walton Bridesmaid III. 9114 *by* Walton Editor 4499.

1470 **R. N. & H. C.**—SANDERS SPENCER.

Class 211.—*Middle White Breeding Sows, farrowed in* 1897, 1898, 1899 *or* 1900. [8 entries, none absent.]

1474 **I.** (£10, & Champion.[1])—SIR GILBERT GREENALL, BT., Walton Hall, Warrington, for **Walton Bridesmaid** 9110, born July 26, 1897 [farrowed Aug. 9, 1901]; *s.* Walton Editor 4499, *d.* Walton Mayflower II. 6126 *by* Badger 2845.

1477 **II.** (£5.[2])—SANDERS SPENCER, Holywell Manor, St. Ives, Hunts, for **Holywell Rosy O'Grady**, born Jan. 14, 1899 [farrowed July 14, 1901]; *s.* Holywell Stumpy Tail 4479, *d.* Holywell Rosy Girl *by* Holywell Count 3239.

1475 **III.** (£3.[2])—J. JEFFERSON, Peel Hall, Chester, born July 30, 1899 [farrowed Aug. 21, 1901], bred by Philip Ascroft, Hesketh Arms Hotel, Rufford, Ormskirk; *s.* Rufus IX. 5313, *d.* Rufford Snowdrop 9090 *by* Rufford Ploughboy 4491.

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[1] Champion Gold Medal, value £5 5*s.*, given by the National Pig Breeders' Association, for the best Middle White Boar or Sow in Classes 209 and 211.

[2] Nos. 1477 and 1475 have succeeded to their present positions by the disqualification, through non-compliance with the Regulation as to farrowing before September 1, of No. 1476 (Second Prize in Class 211).

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

1473 **H. C.**—Sir GILBERT GREENALL, BT., for **Walton Rose VIII.**

Com.—THE HON. D. P. BOUVERIE, for No. 1472, **Coleshill Jane II.**; ALFRED C. TWENTYMAN, for No. 1478, **Castlecroft Lavender**, & No. 1479, **Castlecroft Peggy II.**

Class 212.—*Pens of Three Middle White Sow Pigs, farrowed in* 1901. [4 entries.]

1482 **I.** (£10.)—SANDERS SPENCER, Holywell Manor, St. Ives, Hunts, born Jan. 16; *s.* Holywell Rosador II. 6139, *d.* Holywell Jubilant *by* Holywell Count 3239.

1480 **II.** (£5.)—SIR GILBERT GREENALL, BT., Walton Hall, Warrington, born Jan. 4; *s.* Walton Andrew 6167, *d.* Walton Rose VIII. 9130 *by* Walton Editor 4499.

1481 **R. N. & H. C.**—SANDERS SPENCER, born Jan. 17.

1483 **H. C.**—ALFRED C. TWENTYMAN.

Small White Breed.

Class 213.—*Small White Boars, farrowed in* 1899 *or* 1900. [2 entries.]

1484 **I.** (£10, & **R. N. for Champion.**[1])—THE HON. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, born May 26, 1900; *s.* Coleshill Edward 4509, *d.* Coleshill Sunbeam II. 5458 *by* King William 2097.

1485 **R. N. & H. C.**—SIR GILBERT GREENALL, BT., for **Walton Champion.**

Class 214.—*Pens of Three Small White Boar Pigs, farrowed in* 1901. [2 entries, 1 absent.]

1486 **I.** (£10.)—THE HON. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, born Jan. 5; *s.* Longford Emperor 5329, *d.* Longford Belle 9884 *by* Coleshill Eastbourne 4507.

Class 215.—*Small White Breeding Sows, farrowed in* 1897, 1898, 1899 *or* 1900. [4 entries, 1 absent.]

1489 **I.** (£10, & **Champion.**[1])—THE HON. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, born May 26, 1900 [farrowed Aug. 13, 1901]; *s.* Coleshill Edward 4509, *d.* Coleshill Sunbeam II. 5458 *by* King William 2097.

1488 **II.** (£5.)—THE HON. D. P. BOUVERIE, born March 16, 1900, [farrowed Aug. 13, 1901]; *s.* Coleshill Jim 5279, *d.* Coleshill Grace 10842 *by* Coleshill Edward 4509.

Class 216.—*Pens of Three Small White Sow Pigs, farrowed in* 1901. [4 entries, none absent.]

1494 **I.** (£10.)—ARTHUR HISCOCK, JUN., Manor Farm, Motcombe, Shaftesbury, born Jan. 3; *s.* Manor Tommy 6187, *d.* Manor Tiny 10858 *by* Coleshill Royal Emperor 4521.

1492 **II.** (£5.)—THE HON. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, born Jan. 5; *s.* Longford Emperor 5329, *d.* Longford Belle 9884 *by* Coleshill Eastbourne 4507.

1495 **R. N. & H. C.**—ARTHUR HISCOCK, JUN., born Jan. 3.

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[1] Champion Gold Medal, value £5 5*s.*, given by the National Pig Breeders' Association, for the best Small White Boar or Sow in Classes 213 and 215.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Berkshire Breed.

Class 217.—*Berkshire Boars, farrowed in* 1899 *or* 1900. [14 entries, 4 absent.]

1501 I. (£10, & Champion.[1])—EDNEY HAYTER, The Mount, Whitchurch, Hants, born June 20, 1899, bred by E. Burbidge, South Wraxhall, Bradford-on-Avon; *s.* Jack of All Trades 6500, *d.* Stratton Polly 6812 *by* Compton Lord 6230.

1504 II. (£5.)—J. JEFFERSON, Peel Hall, Chester, for **Peel King Edward VII.** 7564, born June 24, 1899, bred by E. Burbidge, South Wraxhall, Bradford-on-Avon; *s.* Jack of all Trades 6500, *d.* Stratton Mary 6811 *by* Stratton Teddy 5860.

1497 III. (£3.)—JULIUS A. FRICKER, Burton, Mere, Wilts, for **Bridgend F.** 7821, born July 28, 1899; *s.* First Catch F. 5925, *d.* Sister E. F. B. 6455 *by* Highmere 4750.

1498 R. N. & H. C.—JULIUS A. FRICKER, born June 5, 1900.

1506 H. C.—EDWARD LEWIS, for **The Earl.**

Com.—H. OAKDEN FISHER, for No. 1496; SIR H. F. DE TRAFFORD, BT., for No. 1509, **Harborough Foundation.**

Class 218.—*Pens of Three Berkshire Boar Pigs, farrowed in* 1901. [7 entries, 3 absent.]

1511 I. (£10.)—R. W. HUDSON, Danesfield, Great Marlow, born Jan. 13; *s.* Manor Favourite 7831, *d.* Gentle Jane 6806 *by* Swansea 3751.

1510 II. (£5.)—JULIUS A. FRICKER, Burton, Mere, Wilts, born Jan. 3; *s.* First Catch F. 5925, *d.* Gillingham F. 5538 *by* Tapsay Hero 4309.

1513 R. N —JAMES LAWRENCE, Stall Pitts Farm, Shrivenham, Berks.

Class 219.—*Berkshire Breeding Sows, farrowed in* 1897, 1898, 1899, *or* 1900. [19 entries, 4 absent.]

1519 I. (£10)[2]—EDWARD BURBIDGE, South Wraxhall, Bradford-on-Avon, Wilts, born Jan. 6, 1900 [farrowed Aug. 19, 1901]; *s.* Pressmoor Foundation II. 7549, *d.* Maid-in-Waiting 6803 *by* Braggs 5974.

1531 II. (£5.)[2]—J. JEFFERSON, Peel Hall, Chester, for **Peel Agnes** 7333, born Sept. 7, 1898 [farrowed Aug. 4, 1901]; *s.* Peel Duke 6247, *d.* Peel Dora 6697 *by* Sir William 5574.

H. C.—NATHANIEL BENJAFIELD, for No. 1517; J. JEFFERSON, for No. 1532, **Peel Flirt**; JAMES LAWRENCE, for No. 1533, **Longcott Lass.**

Com.—FRED EVANS, for No. 1521, **Breaksea Letty**; JULIUS A. FRICKER, for No. 1522; DR. F. RUTHERFOORD HARRIS, for No. 1523, **Gillingham N. C.**; ARTHUR HISCOCK, JUN. for No. 1527, **Manor Princess.**

Class 220.—*Pens of Three Berkshire Sow Pigs, farrowed in* 1901. [11 entries, 1 absent.]

1536 I. (£10.)—NATHANIEL BENJAFIELD, Shorts Green Farm, Motcombe, Shaftesbury, born Jan. 2; *s.* Ace of Trumps 6520, *d.* Fanes Sow *by* Letcombe Lord 5423.

1539 II. (£5.)—JULIUS A FRICKER, Burton, Mere, Wilts, born Jan. 2; *s.* First Catch F. 5925, *d.* Torrington F. 5920 *by* Tapsay Hero 4309.

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[1] Champion Prize of £5, given by the British Berkshire Society, for the best Berkshire Boar or Sow in Classes 217 and 219.

[2] Nos. 1519 and 1531 have succeeded to their present positions by the disqualification through non-compliance with the Regulation as to farrowing before September 1, of No. 1528 (First Prize in Class 219 and R. N. for Champion). The Reserve Number (No. 1526) failed to comply with the Regulation, and consequently did not succeed to the Third Prize.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

1542 **III.** (£3.)—R. W. Hudson, Danesfield, Great Marlow, Bucks, born Jan. 13; *s.* Manor Favourite 7831, *d.* Gentle Jane 6806 *by* Swansea 3751.

1541 **R. N. & H. C.**—R. W. Hudson, born Jan. 20.
H. C.—Edward Burbidge, for No. 1537; Sir H. F. de Trafford, Bt., for No. 1516.

Tamworth Breed.

Class 221.—*Tamworth Boars, farrowed in* 1899 *or* 1900.
[1 entry.]

1547 I. (£10.)—Robert Ibbotson, Knowle, Warwickshire, for **Knowle Welshman**, born Jan. 8, 1900, bred by H. C. Stephens, Cholderton, Salisbury; *s.* Whitacre Welshman 5411, *d.* Whitacre Beauty 8526 *by* Warwickshire Monarch 4597.

Class 222.—*Pens of Three Tamworth Boar Pigs, farrowed in* 1901.
[5 entries, 1 absent.]

1552 I. (£10.)—D. W. Philip, Whitacre, Birmingham, born Jan. 6; *s.* Knowle Hiawatha 5781, *d.* Whitacre Matchless 10050 *by* Whitacre Lawyer 4985.
1549 II. (£5.)—Robert Ibbotson, Knowle, Warwickshire, born Jan. 3; *s.* Knowle Meteor 5787, *d.* Knowle Vesta 9248 *by* Lord Chamberlain 4971

1550 **R. N.**—W. H. Mitchell, Elmdene, Kenilworth, born Jan. 18.

Class 223.—*Tamworth Breeding Sows, farrowed in* 1897, 1898, 1899, *or* 1900. [8 entries, none absent.]

1553 I. (£10, & Champion.[1])—Robert Ibbotson, Knowle, Warwickshire, for **Knowle Red Mane 2nd**, born May 20, 1899 [farrowed July 7, 1901]; *s.* Knowle Masher 5375, *d.* Knowle Red Rose 9256 *by* Knowle Red Monarch 4953.
1558 II. (£5, & R. N. for Champion.[1])—D. W. Philip, Whitacre, Birmingham, for **Whitacre Favourite III.** 10046, born Feb. 7, 1899, [farrowed July 14, 1901]; *s.* Whitacre Welshman 5411, *d.* Whitacre Favourite 7830 *by* Knowle Rector 3783.
1559 III. (£3.)—D. W. Philip, for **Whitacre Matchless** 10050, born May 30, 1899 [farrowed July 9, 1901]; *s.* Whitacre Lawyer 4985, *d.* Whitacre Madam 9330 *by* Knowle Church Warden 4937.

1560 **R. N. & H. C.**—Henry C. Stephens, for **Cholderton Beauty.**
1557 **H. C.**—D. W. Philip, for **Whitacre Countess 5th.**

Class 224.—*Pens of Three Tamworth Sow Pigs, farrowed in* 1901.
[8 entries, 2 absent.]

1561 I. (£10.)—Robert Ibbotson, Knowle, Warwickshire, born Jan 2; *s.* Knowle Forester 5369, *d.* Knowle Mayflower 7094 *by* Knowle Major 3327.
1567 II. (£5.)—Henry C. Stephens, Cholderton, Salisbury, born Jan. 7; *s.* Knowle King III. 1945, *d.* Whitacre Beauty 8526 *by* Warwickshire Monarch 4597.
1563 III. (£3.)—Robert Ibbotson, born Jan 11, bred by Mrs E. Ibbotson, Gun Hill, Arley, Coventry; *s.* Knowle Hiawatha 5781, *d.* Knowle Red Mane 2nd *by* Knowle Masher 5375.

1566 **R. N. & H. C.**—D. W. Philip, Whitacre, Birmingham, born Jan. 6.
1565 **H. C.**—W. H. Mitchell. 1562 **Com.**—Col. Ivor Herbert, C.B., C.M.G.

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[1] Champion Gold Medal, value £5 5*s.*, given by the National Pig Breeders' Association, for the best Tamworth Boar or Sow in Classes 221 and 223.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Large Black Breed.

Class 225.—*Large Black Boars, farrowed in* 1899 *or* 1900. [2 entries.]

1569 **I. (£10.)**—Arthur H. Cobbald, Eldo House, Bury St. Edmunds, born June 2, 1900; *s.* Benwall 25, *d.* Akenham Cornish Lass 14.

1570 **R. N.**—Herbert Ash Hope, Cloughton Fields Dairy Farm, Cloughton, R.S.O., Yorks, for **Cloughton Marquis.**

Class 226.—*Large Black Breeding Sows, farrowed in* 1897, 1898, 1899, *or* 1900. [5 entries, 1 absent.]

1575 **I. (£10.)**—Herbert Ash Hope, Cloughton, R.S.O., Yorks, for **York Sunflower 1st 630**, born April 15, 1899 [farrowed Aug. 12, 1901]; bred by Robert Mitter, Polgarrow, St. Kew, Wadebridge, Cornwall; *s.* Tideford Longsides 135.

1574 **II. (£5.)**—Herbert Ash Hope, for **Penvose Rose II. 376**, born April 30, 1898 [farrowed July 30, 1901], bred by Samuel Bastard, Penvose Mill, St. Tudye, R.S.O., Cornwall; *s.* Bodmin Ringleader 41, *d.* Penvose Rose 1st 374 *by* St. Austell.

1571 **R. N. & H. C.**—Arthur H. Cobbald, born June 2, 1900.

1573 **H. C.**—Herbert Ash Hope, for **Cloughton Jewel.**

POULTRY.

By "Cock," "Hen," "Drake," "Duck," "Gander," and "Goose" are meant birds hatched previous to January 1st, 1901.

By "Cockerel," "Pullet," "Young Drake," and "Duckling" are meant birds hatched in 1901, previous to June 1st.

FOWLS.

Game.

Class 227.—*Old English Game Cocks.* [18 entries, none absent.]

1576 **I. (30*s.*)**—Fred Anderton, Sawley Grange, Skipton, Yorks.
1593 **II. (15*s.*)**—George Young, Orthwaite Hall, Wigton. May 1, 1898.
1583 **III. (10*s.*)**—W. H. Lewis, Green Meadow, Treorchy, Glam. April 30, 1899.
1580 **R. N. & H. C.**—James Green, 49 Bolton Road, Silsden, Yorks.
1579 **H. C.**—Thomas Garner.

Class 228.—*Old English Game Hens.* [16 entries, 1 absent.]

1605 **I. (30*s.*)**—Tom Little, Applegarth, Abbey Town, Cumb. April 5, 1898.
1600 **II. (15*s.*)**—John R. T. Kingwell, Great Aish, South Brent, Devon. 1899.
1596 **III. (10*s.*)**—Wilson Butler, Glebelands, Broughton-in-Furness, Lancashire. April 10, 1898.
1609 **R. N. & H. C.**—Phillip Pendry. March, 1898.

H. C.—Fred Anderton, for No. 1594; Wm. Henry Lewis, for No. 1602; Isaac W. Messenger, for No. 1607.

Com.—John Dawson, for No. 1597; Wm. Henry Lewis, for No. 1603; Miss Eurgain Lort, for No. 1606.

Class 229.—*Old English Game Cockerels.* [11 entries, 1 absent.]

1619 I. (30*s.*)—Isaac W. Messenger, Hensingham, Whitehaven. Jan.
1612 II. (15*s.*)—Philip A. Fisher, Carhead, Crosshills, Keighley. Jan. 12.
1616 III. (10*s.*)—Tom Little, Applegarth, Abbey Town, Cumb. Jan. 4.
1617 R. N. & H. C.—Mrs. Marsden, Bashall-Eaves, Clitheroe, Lancs. Jan 3.

Class 230.—*Old English Game Pullets.* [8 entries, none absent.]

1628 I. (30*s.*)—Isaac W. Messenger, Hensingham, Whitehaven, Jan.
1626 II. (15*s.*)—Wm. H. Harker, Salt House Farm, Millom, Cumb. Jan 4.
1624 III. (10*s.*)—Philip A. Fisher, Carhead, Crosshills, Keighley. Jan. 12.
1623 R. N & H. C.—Philip A. Fisher. 1625 H. C.—Thomas Garner.

Class 231.—*Indian Game Cocks.* [9 entries, none absent.]

1632 I. (30*s.*) - James Frayne, Piper's Pool, Egloskerry, R.S.O , Cornwall. 1900.
1631 II. (15*s.*)—George Doble, Clarence Villa, Bridgwater, Somerset. 1899.
1633 III. (10*s.*)—R. Gaunt, Albany Villa, Eaglescliffe, R.S.O , co. Durham.
1635 R. N. & H. C.—Joseph Kitchin. 1630 H. C.—William Brent.

Class 232.—*Indian Game Hens.* [9 entries, none absent.]

1639 I. (30*s.*)—William Brent, Clampit Farm, Callington, Cornwall. 1898.
1644 II. (15*s.*)—Joseph Kitchin, 42 Kent Street, Lower Grange, Cardiff.
1643 III. (10*s.*)—J. N. Jackman, Burnville, Tavistock, Devon. Feb. 1899.
1610 R. N. & H. C.—James Frayne, Piper's Pool, Egloskerry, R.S.O.

Class 233.—*Indian Game Cockerels.* [10 entries, 1 absent.]

1651 I. (30*s.*)—J. N. Jackman, Burnville, Tavistock, Devon. Jan. 12.
1649 II. (15*s.*)—John Frayn, St. Stephens, Launceston, Cornwall.
1648 III. (10*s.*)—James Frayne, Piper's Pool, Egloskerry, R.S.O. Jan. 9.
1652 R. N. & H. C.—J. N Jackman. Feb. 2.

Class 234.—*Indian Game Pullets.* [14 entries, none absent.]

1661 I. (30*s.*)—John Frayn, St. Stephens, Launceston, Cornwall.
1660 II. (15*s.*)—James Frayne, Piper's Pool, Egloskerry, R.S.O. Jan. 9.
1658 III. (10*s.*)—George Faulkner. Rowton, Chester. Jan. 4.
1665 R. N. & H. C.—J. N. Jackman, Burnville, Tavistock, Devon. Jan. 12.
1663 H. C.—Richard Gaunt.

Dorkings.

Class 235.—*Coloured Dorking Cocks.* [9 entries, none absent.]

1672 I. (30*s*)—A. K. Crichton, Glamis, Forfarshire. 1898.
1673 II. (15*s.*)—Viscount Deerhurst, Birlingham House, Pershore. 1899.
1677 III. (10*s.*)– A. T. & H. Pears. Mere, Lincoln.
1679 R. N. & H. C. -Arthur E. Ward, Ivy Lea, Sale, Cheshire. 1900.
1678 H. C.—Herbert Reeves. 1675 Com.—Charles Ford.

Class 236.—*Coloured Dorking Hens.* [6 entries, none absent.]

1681 I. (30*s.*)—Viscount Deerhurst, Birlingham House, Pershore. 1898.
1684 II. (15*s.*) -Herbert Reeves, Emsworth, Hants. 2 years.
1680 III. (10*s.*)—A. K. Crichton, Glamis, Forfarshire. 1899.
1683 R. N. & H. C.—The Countess of Home. 1682 H. C.—Robert Fitton.

Class 237.—*Coloured Dorking Cockerels.* [5 entries, none absent.]

1689 I. (30*s.*), & 1690 II. (15*s.*)—Herbert Reeves, Emsworth, Hants. Jan. 1.
1688 III. (10*s.*) -J. Harris, Greenfield Poultry Yard, Carmarthen. Feb. 23.
1687 R. N. & H. C.—Robert Fitton, Ribby Hall, Kirkham, Lancs.

Class 238.—*Coloured Dorking Pullets.* [8 entries, 1 absent.]

1697 **I.** (30*s.*), & 1698 **III.** (10*s.*)—Herbert Reeves, Emsworth, Hants. Jan. 8.
1695 **II.** (15*s.*)—The Countess of Home, The Hirsel, Coldstream. Jan. 3.
1694 **R. N. & H. C.**—John Harris, Greenfield Poultry Yard, Carmarthen.
H. C.—R. Fitton, for No. 1693; Capt. G. Phipps Hornby, for No. 1696.
1691 **Com.**—Thomas Brocklebank.

Class 239.—*Silver Grey Dorking Cocks.* [10 entries, 3 absent.]

1704 **I.** (30*s.*)—Robert Fitton, Ribby Hall, Kirkham, Lancs. 1899.
1702 **II.** (15*s.*)—Viscount Deerhurst, Birlingham House, Pershore. 1899.
1708 **III.** (10*s.*)—H. M. Sperling, Lew Trenchard, Lew Down, Devon. 1899.
1705 **R. N. & H. C.**—The Countess of Home, The Hirsel, Coldstream. 2 yrs.
H. C.—Viscount Deerhurst, for No. 1703; H. Reeves, for No. 1707.
1700 **Com.**—O. E. Cresswell.

Class 240.—*Silver Grey Dorking Hens.* [7 entries, 1 absent.]

1709 **I.** (30*s.*)—The Hon. Florence Amherst, Didlington Hall, Brandon.
1713 **II.** (15*s.*)—Robert Fitton, Ribby Hall, Kirkham, Lancs. 1899.
1712 **III.** (10*s.*)—Viscount Deerhurst, Birlingham House, Pershore. 1899.
1714 **R. N. & H. C.**—Herbert Reeves, Emsworth, Hants. 3 years.
1711 **H. C.**—O. E. Cresswell. 1710 **Com.**—O. E. Cresswell.

Class 241.—*Silver Grey Dorking Cockerels.* [10 entries, none absent.]

1717 **I.** (30*s.*)—Chas. Aitkenhead, Stud Farm, Seaham Harbour, Jan. 2.
1725 **II.** (15*s.*), & 1724 **III.** (10*s.*)—Herbert Reeves, Emsworth, Hants. Jan. 1.
1720 **R. N. & H. C.**—Viscount Deerhurst, Birlingham House, Pershore.
H. C.—C. Aitkenhead, for No. 1716; Capt. G. Phipps Hornby, for No. 1722.
1719 **Com.**—The Hon. Florence Amherst.

Class 242.—*Silver Grey Dorking Pullets.* [10 entries, none absent.]

1733 **I.** (30*s.*), & 1734 **III.** (10*s.*)—Herbert Reeves, Emsworth, Hants. Jan. 8
1731 **II.** (15*s.*)—Robert Fitton, Ribby Hall, Kirkham, Lancs. Jan.
1730 **R. N. & H. C.**—Viscount Deerhurst, Birlingham House, Pershore.
H. C.—Chas. Aitkenhead, for Nos. 1726 & 1727; The Hon. Florence Amherst, for No. 1729.
Com.—The Hon. Florence Amherst, for No. 1728; Captain G. Phipps Hornby, for No. 1732.

Class 243.—*White or Cuckoo Dorking Cocks or Cockerels.* [3 entries.]

1738 **I.** (30*s.*)—Philip Lee, Ellesmere House, Wem, Shropshire. Over 1 year.
1736 **II.** (15*s.*)—O. E. Cresswell, Morney Cross, near Hereford. 1896.
1737 **R. N. & H. C.**—O. E. Cresswell. 1900.

Class 244.—*White or Cuckoo Dorking Hens or Pullets.* [4 entries.]

1739 **I** (30*s*)—O. E. Cresswell, Morney Cross, near Hereford. 1895
1740 **II.** (15*s.*)—O. E. Cresswell. 1899.
1742 **R. N. & H. C.**—Philip Lee, Ellesmere House, Wem. Shropshire.
1741 **H. C.**—O. E. Cresswell.

Brahmas and Cochins.

Class 245.—*Brahma Cocks.* [7 entries, 1 absent.]

1743 **I.** (30*s.*)—G. W. Henshall, Field House, Urmston, Manchester.
1744 **II.** (15*s.*)—The Countess of Home, The Hirsel, Coldstream.
1745 **III.** (10*s.*)—H. M. Sperling, Lew Trenchard, Lewdown, Devon. 1899.
1746 **R. N. & H. C.**—S. W. Thomas, Glasfryn, Forest Fach, Swansea.
1749 **H. C.**—E. J. Williams.

Class 246.—*Brahma Hens.* [6 entries, 1 absent.]

1750 **I.** (30*s.*)—G. W. Henshall, Field House, Urmston, Manchester.
1754 **II.** (15*s.*)—Arthur E. Ward, Ivy Lea, Sale, Cheshire. 1900.
1751 **III.** (10*s.*)—Mrs. H. E. Netten, 98 Mount Gould Road, Lipson, Plymouth.
1753 **R. N. & H. C.**—S. W. Thomas, Glasfryn, Forest Fach, Swansea.

Class 247.—*Cochin Cocks.* [6 entries, 2 absent.]

1758 **I.** (30*s.*)—William Kean, Willow Bank, Middleton, Lancs.
1760 **II.** (15*s.*)—Mrs. W. O. Smethurst, Oak Villas, Elton, Bury, Lancs. 1899
1756 **III.** (10*s.*)—Thos. Bagshaw, 73 Gough Road, Edgbaston, Birmingham.
1757 **R. N.**—Dr. F. Rutherfoord Harris, Llangibby Castle, Usk, Mon.

Class 248.—*Cochin Hens.* [5 entries, 2 absent.]

1764 **I.** (30*s.*)—Mrs. W. O. Smethurst, Oak Villas, Elton, Bury, Lancs. 1899.
1766 **II.** (15*s.*)—E. J. Williams, 31 Salamanca Rd., Llanelly. Apr. 16, 1899.
1762 **R. N.**—Dr. F. Rutherfoord Harris, Llangibby Castle, Usk, Mon.

Class 249.—*Brahma or Cochin Cockerels.* [3 entries.]

1768 **I.** (30*s.*), & 1767 **II.** (15*s.*)—Thomas Sowerby, Elm Road, Cleethorpes, Grimsby. (Cochin.) Jan. 11.
1769 **R. N.**—S. W. Thomas, Glasfryn, Forest Fach, Swansea. (Brahma.)

Class 250.—*Brahma or Cochin Pullets.* [6 entries.]

1770 **I.** (30*s.*)—Henry Bedford, St. James', Brackley, Northants. (Brahma.)
1774 **II.** (15*s.*)—T. Sowerby, Elm Road, Cleethorpes, Grimsby. (Cochin.)
1772 **III.** (10*s.*)—William Kean, Willow Bank, Middleton, Lancs. (Cochin.)
1775 **R. N. & H. C.**—S. W. Thomas, Swansea. (Brahma.)
1773 **H. C.**—Thomas Sowerby. 1771 **Com.**—The Countess of Home.

Langshans.

Class 251.—*Langshan Cocks.* [6 entries, none absent.]

1776 **I.** (30*s.*), & 1777 **II.** (15*s.*)—W. H. Crane, Great Barr Hall, near Birmingham. 1900.
1778 **III.** (10*s.*)—F. C. Griffin, 51 Holton Road, Barry, Glam. April 16, 1900.
1779 **R. N. & H. C.**—A. S. Hiscock, Brookfield, Trowbridge. 1900.

Class 252.—*Langsham Hens.* [4 entries.]

1783 **I.** (30*s.*)—F. C. Griffin, 51 Holton Road, Barry, Glam. April 16, 1900.
1782 **II.** (15*s.*)—W. H. Crane, Great Barr Hall, nr. Birmingham. 1900.
1784 **R. N. & H. C.**—Dr. F. Rutherfoord Harris, Llangibby Castle, Usk.
1785 **Com.**—A. S. Hiscock.

Class 253.—*Langshan Cockerels.* [4 entries, none absent.]

1787 **I.** (30*s.*), & 1786 **R. N. & H. C.**—C. J. Barnett, Mill End, Henley-on-Thames. Jan. 11.
1789 **II.** (15*s.*)—Hutchinson Bros., Scaling, Loftus, Yorks. Jan. [illegible]

Class 254.—*Langshan Pullets.* [2 entries.]

1790 I. (30*s.*), & 1791 **R. N. & H. C.**—C. J. BARNETT, Mill End, Henley-on Thames. Jan. 11.

Plymouth Rocks.

Class 255.—*Plymouth Rock Cocks.* [11 entries, 1 absent.]

1795 I. (30*s.*), & 1796 **R. N. & H. C.**—E. S. JACKSON, M.D., Bolton-le-Sands, Carnforth.
1794 II. (15*s.*)—ROBERT FITTON, Ribby Hall, Kirkham, Lancs. 1900.
1798 III. (10*s.*)—HENRY PINCHBECK, The Elms, Burton-on-Trent. 1900.
H. C.—SAMUEL DONKIN, for No. 1793; LADY MURIEL STRANGWAYS, for No. 1801.

Class 256.—*Plymouth Rock Hens.* [11 entries, none absent.]

1806 I. (30*s.*), & 1807 III. (10*s.*)—E. S. JACKSON, M.D., Bolton-le-Sands.
1808 II. (15*s.*)—HENRY PINCHBECK, The Elms, Burton-on-Trent. 1899.
1813 **R. N. & H. C.**—MRS. H. TURNER, Elmdale, Stechford, near Birmingham.
H. C.—ABBOT BROS., for No. 1803; PHILIP H. RAWSON, for No. 1809; NOBLE RICHARDSON, for No. 1810.

Class 257.—*Plymouth Rock Cockerels.* [11 entries, 2 absent.]

1820 I. (30*s.*), 1821 II. (15*s.*), & 1819 **R. N. & H. C.**—E. S. JACKSON M.D., Bolton-le-Sands, Carnforth. Jan. 2.
1816 III. (10*s.*)—ROBERT FITTON, Ribby Hall, Kirkham, Lancs. Jan.
Com.—WM. SLATER, for No. 1823; E. WILSON, for No. 1824.

Class 258.—*Plymouth Rock Pullets.* [11 entries, 1 absent.]

1834 I. (30*s.*)—WM. SLATER, Silverdale, near Carnforth, Lancs. Jan. 20.
1828 II. (15*s.*)—E. S. JACKSON, M D., Bolton-le-Sands, Carnforth. Jan. 10.
1829 III. (10*s.*)—E. S. JACKSON, M.D.,. Jan. 15.
1827 **R. N. & H. C.**—SAMUEL DONKIN, Studley, Warwickshire. Jan. 25.
H. C.—FRANK NEAVE, for Nos. 1831 and 1832.

Wyandottes.

Class 259.—*Silver Laced Wyandotte Cocks.* [10 entries, 1 absent.]

1843 I. (30*s.*)—HY. PICKLES, Kayfield House, Earby, Colne, Yorks.
1845 II. (15*s.*)—TAYLOR BROS., Brailes Brewery, Banbury. May, 1900.
1836 III. (10*s.*)—ABBOT BROS., Thuxton, Norfolk. 1900.
1842 **R. N. & H. C.**—W. H. HUNT, Goathurst, Bridgwater.

Class 260.—*Silver Laced Wyandotte Hens.* [9 entries, 1 absent.]

1853 I. (30*s.*)—DARCY E. TAYLOR, The Rocks, Marshfield, Glos. 1900.
1849 II. (15*s.*)—W. H. HUNT, Goathurst, Bridgwater, Somerset. April, 1900.
1851 III. (10*s.*)—H. MAIDMENT, Hayton Gate, Low Row, Carlisle.
1846 **R. N. & H. C.**, & 1847 **H. C.**—ABBOT BROS., Thuxton, Norfolk. 1900.

Class 261.—*Silver Laced Wyandotte Cockerels.* [6 entries, 1 absent.]

1858 I. (30*s.*)—FRANK NEAVE, Lingwood, Norwich. Jan.
1859 II. (15*s.*)—H. PICKLES, Kayfield House, Earby, Colne, Yorks. Jan 20.
1857 III. (10*s.*)—HERBERT GROOM, Ivy Cottage, Prestwood, Great Missenden.
1860 **R. N. & H. C.**—WM. WATKINS. 1865 **H. C.**—MORTIMER G. GOLDSMITH.

Class 262.—*Silver Laced Wyandotte Pullets.* [10 entries, none absent.]

1864 I. (30*s.*)—Herbert Groom, Ivy Cottage, Prestwood, Great Missenden.
1865 II. (15*s.*)—Lockwood & Gill, Pateley Bridge, Yorks. Jan.
1863 III. (10*s.*)—Mortimer G. Goldsmith, Blendworth, Horndean, Hants.
1869 R. N. & H. C.—R. R. Whitfield, Rodidge Farm, Fradley, Lichfield.

Class 263.—*Gold Laced Wyandotte Cocks.* [13 entries, none absent.]

1879 I. (30*s.*)—H. Pickles, Kayfield House, Earby, Colne, Yorks.
1874 II. (15*s.*)—A. J. Brock, 19 St Peter's St., Canterbury. 1 yr., 11 mths.
1872 III. (10*s.*)—Abbot Bros., Thuxton, Norfolk. 1900.
1875 R. N & H. C.—H. W. Buckland, Rupert House, Lower Wick, Worcester.
H. C.—Abbot Bros., for No. 1871; Mrs. Pierson, for Nos. 1880 & 1881; Wallis Titt, for No. 1882.

Class 264.—*Gold Laced Wyandotte Hens.* [5 entries, 1 absent.]

1885 I. (30*s.*)—Lockwood & Gill, Pateley Bridge, Yorks. 1900.
1887 II. (15*s.*)—Mrs. Pierson, Morley Rectory, Wymondham, Norfolk. 1900.
1884 III. (10*s.*)—Abbot Bros., Thuxton, Norfolk. 1900.
1888 R. N. & H. C.—Mrs. Pierson.

Class 265.—*Gold Laced Wyandotte Cockerels.* [11 entries, 1 absent.]

1893 I. (30*s.*)—M. G. Goldsmith, Blendworth, Horndean, Hants. Jan. 2.
1891 II. (15*s.*)—A. J. Brock, 19 St. Peter's Street, Canterbury. Jan. 1.
1897 III. (10*s.*)—H. Pickles, Kayfield House, Earby, Colne, Yorks. Jan. 20.
1894 R. N. & H. C.—Mortimer G. Goldsmith.
1899 H. C.—Noble Richardson. 1898 Com.—Mrs Pierson.

Class 266.—*Gold Laced Wyandotte Pullets.* [8 entries, none absent.]

1904 I. (30*s.*)—Mortimer G. Goldsmith, Blendworth, Horndean, Hants.
1900 II. (15*s.*)—Abbot Bros, Thuxton, Norfolk. Feb.
1903 III. (10*s.*)—O. Duxbury, Carrs House Farm, Barnoldswick, Yorks.
1905 R. N. & H. C.—S. Phil. Hayward, Norfolk Lodge, Sutton Coldfield

Class 267.—*Wyandotte Cocks or Cockerels, any other variety.* [15 entries, 1 absent.]

1920 I. (30*s.*)—John Wharton, Honeycott Farm, Hawes, Yorks. (Partridge.)
1922 II. (15*s.*)—Wootton & Ellis, Cauldwell Hall Road, Ipswich. (Partridge.)
1911 III. (10*s.*)—E. S. Jackson, M.D., Bolton-le-Sands, Carnforth. (Buff.)
1916 R. N. & H. C.—Col. S. Sandbach, Hafodunos, Abergele. (Partridge.)
H. C.—Tennyson Fawkes, for No. 1909; Lockwood & Gill, for No. 1912; Harry Wicks, for No. 1921.

Class 268.—*Wyandotte Hens or Pullets, any other variety.* [15 entries, 1 absent.]

1935 I. (30*s.*)—John Wharton, Honeycott Farm, Hawes, Yorks. (Partridge.)
1938 II. (15*s.*)—Mrs. W. O. Smethurst, Oak Villas, Elton, Bury. (White.)
1926 III. (10*s.*)—E. S. Jackson M.D., Bolton-le-Sands, Carnforth. (Buff.)
1930 R. N. & H. C.—Fred W. Myhill. (Partridge.)
H. C.—Lockwood & Gill, for No. 1927; W. H. Simcock, for No. 1932; John Wharton, for No. 1936; E. Wilson, for No. 1937.

Orpingtons.

Class 269.—*Buff Orpington Cocks.* [12 entries, 1 absent.]

1949 I. (30*s.*)—R. R. Whitfield, Rodidge Farm, Fradley, Lichfield.
1946 II. (15*s.*)—Col. S. Sandbach, Hafodunos, Abergele, Denbigh. 1900.
1942 III. (10*s.*)—E. S. Jackson, M.D., Bolton-le-Sands, Carnforth.

1939 **R. N. & H. C.**—Frank Bloomer, Foxcote Farm, Stourbridge. 1900.
H. C.—Abbot Bros., for No. 1938; Lockwood & Gill, for No. 1943; R. R. Whitfield, for No. 1948.
1940 **Com.**—W. Cook & Sons.

Class 270.—*Buff Orpington Hens.* [7 entries, 1 absent.]

1955 **I.** (30*s.*)—R. R. Whitfield, Rodidge Farm, Fradley, Lichfield.
1951 **II.** (15*s.*)—W. Cook & Sons, Orpington House, St. Mary Cray, Kent.
1952 **III.** (10*s.*)—Thomas Kirk Peacock, Roggiett, Chepstow, Mon.
1950 **R. N. & H. C.**—Frank Bloomer, Foxcote Farm, Stourbridge. 1900.

Class 271.—*Buff Orpington Cockerels.* [11 entries, 3 absent.]

1962 **I.** (30*s.*)—Miss Edwards, Coaley Poultry Farm, Dursley, Glos. Jan. 1.
1958 **II.** (15*s.*), & 1957 **R. N. & H. C.**—Abbot Bros., Thuxton, Norfolk. Feb.
1963 **III.** (10*s.*)—Miss Dulcie Howell, Munslow, Craven Arms, Salop.
1965 **H. C.**—Frank Neave.

Class 272.—*Buff Orpington Pullets.* [16 entries, 2 absent.]

1972 **I.** (30*s.*)—E. Cobb & Co., Tatenhill, Burton-on-Trent
1973 **II.** (15*s.*)—W. Cook & Sons, Orpington House, St. Mary Cray, Kent.
1968 **III.** (10*s.*)—Abbot Bros., Thuxton, Norfolk. Feb.
1981 **R. N. & H. C.**—Wm. Slater, Silverdale, near Carnforth, Lancs.
1977 **H. C.**—E. S. Jackson, M.D.

Class 273.—*Orpington Cocks, any other variety.* [8 entries, 3 absent.]

1985 **I.** (30*s.*)—W. Cook & Sons, Orpington House, St. Mary Cray, Kent.
1986 **II.** (15*s.*)—Tennyson Fawkes, Stroud, Glos. 1900.
1984 **III.** (10*s.*)—Thomas Barrett, Crossvale, Llanpumpsaint, Carmarthen.
1988 **R. N. & H. C.**—A. S. Hiscock. 1991 **H. C.**—Henry Wilson.

Class 274.—*Orpington Hens, any other variety.* [8 entries, 2 absent.]

1992 **I.** (30*s.*)—Thomas Barrett, Crossvale, Llanpumpsaint, Carmarthen.
1993 **II.** (15*s.*)—W. Cook & Sons, Orpington House, St. Mary Cray, Kent.
1998 **III.** (10*s.*)—Joseph Walls, Aston Hall, Sutton Coldfield, Warwickshire.
1995 **R. N. & H. C.**—A. S. Hiscock.
1994 **H. C.**—Dr. F. Rutherfoord Harris.

Class 275.—*Orpington Cockerels, any other variety.* [7 entries, 2 absent.]

2000 **I.** (30*s.*)—Thomas Barrett, Crossvale, Llanpumpsaint, Carmarthen.
2002 **II.** (15*s.*)—Tennyson Fawkes, Stroud, Glos. Feb. 3.
2003 **R. N. & H. C.**—The Countess of Home, The Hirsel, Coldstream.

Class 276.—*Orpington Pullets, any other variety.* [8 entries, 2 absent.]

2007 **I.** (30*s.*)—Thomas Barrett, Crossvale, Llanpumpsaint, Carmarthen.
2008 **II.** (15*s.*)—W. Cook & Sons, Orpington House, St. Mary Cray. Jan. 28.
2009 **III.** (10*s.*)—Tennyson Fawkes, Stroud, Glos. Jan. 10.
2010 **R. N. & H. C.**—The Countess of Home, The Hirsel, Coldstream.
2013 **H. C.**—Joseph Walls. 2014 **Com.**—Henry Wilson.

French Breeds (any variety).

Class 277.—*French Cocks.* [6 entries, 1 absent.]

2019 **I.** (30*s.*)—S. W. Thomas, Glasfryn, Forest Fach, Swansea. (Houdan.)
2015 **II.** (15*s.*)—Mesdames C. Hill & Maconochie, Tovil, Maidstone. (Houdan.) 1900.
2017 **III.** (10*s.*)—Philip Lee, Ellesmere House, Wem, Shropshire. (Crève.)
2020 **R. N. & H. C.**—S. W. Thomas. (Crève.) Over 1 year.
2016 **H. C.**—Jonathan Hill.

Class 278.—*French Hens.* [5 entries, 1 absent.]

2021 **I.** (30*s.*)—Philip Lee, Ellesmere House, Wem, Shropshire. (Houdan.)
2023 **II.** (15*s.*)—Mrs. C. Squire, Glenwood, Mortlhoe, Devon. (Houdan.)
2024 **III.** (10*s.*)—S. W. Thomas, Glasfryn, Forest Fach, Swansea. (Houdan.)
2025 **R. N. & H. C.**—S. W. Thomas. (Crève) Over 1 year.

Class 279.—*French Cockerels.* [5 entries, 1 absent.]

2026 (30*s.*)—S. W. Thomas, Glasfryn, Forest Fach, Swansea. (Houdan.)
2029 **II.** (15*s.*)—Mesdames C. Hill & Maconochie, Tovil, Maidstone. (Houdan.) Feb.
2030 **III.** (10*s.*)—S. W. Thomas. (Crève.) Feb. 3.
2027 **R. N. & H C**—Jonathan Hill. (Houdan.)

Class 280.—*French Pullets.* [5 entries, 1 absent.]

2031 **I.** (30*s.*)—Mesdames C. Hill & Maconochie, Tovil, Maidstone. (Houdan.) Feb.
2034 **II.** (15*s*), & 2035 **R. N. & H. C.**—S. W. Thomas, Glasfryn, Forest Fach, Swansea. (Houdan.) Jan. 26.
2032 **III.** (10*s.*)—Jonathan Hill, The Mills, Lostwithiel, Cornwall. (Houdan.) Jan. 10.

Minorcas.

Class 281.—*Minorca Cocks.* [11 entries, none absent.]

2043 **I.** (30*s.*)—Arthur G. Pitts, The Firs, Highbridge, Somerset. 1900.
2038 **II.** (15*s.*)—Fursland Bros., Bridgwater, Somerset. April, 1900.
2046 **III.** (10*s.*)—Mrs. F. M. Webster, Oaks Poultry Farm, Horsforth, Yorks.
2036 **R. N. & H. C.**—John W. Crossman, The Shrubberies, Galphay, Ripon.
2040 **H. C.**—J. H. Knowles-Morgan.
Com.—Mrs. Smethurst, for Nos. 2044 & 2045.

Class 282.—*Minorca Hens.* [12 entries, none absent.]

2053 **I.** (30*s.*)—Arthur G. Pitts, The Firs, Highbridge, Somerset. 1899.
2058 **II.** (15*s.*)—Mrs. F. M. Webster, Oaks Poultry Farm, Horsforth, Yorks.
2056 **III.** (10*s.*)—Mrs. W. O Smethurst, Oak Villas, Elton, Bury, Lancs.
2049 **R. N. & H. C.**—Fursland Bros, Bridgwater, Somerset. May, 1899.
H. C.—D. Warren Lewis, for No. 2052; Arthur George Pitts, for No. 2054; Mrs. W. O. Smethurst, for No. 2057.
Com.—Tennyson Fawkes, for No. 2048; T. C. Plowman, for No. 2055.

Class 283.—*Minorca Cockerels.* [12 entries, none absent.]

2063 **I.** (30*s.*)—The Countess of Home, The Hirsel, Coldstream. Jan. 3.
2065 **II.** (15*s.*)—J. H. Knowles-Morgan, Carter's Green, West Bromwich.
2069 **III.** (10*s*)—Mrs F. M. Webster, Oaks Poultry Farm, Horsforth, Yorks.
2060 **R. N. & H. C.**—Tennyson Fawkes, Stroud, Glos. Jan. 15
H. C.—Robert Fitton, for No. 2061; Wade Bros, for No. 2068.
Com.—John W. Crossman, for No. 2059; J. Hodges, for No. 2062; Ben. Wilkinson, for No. 2070.

Class 284.—*Minorca Pullets.* [11 entries, 1 absent.]

2071 **I. (30*s*.)**—John W. Crossman, The Shrubberies, Galphay, Ripon. Jan. 2.
2080 **II. (15*s*.)**—Mrs. F. M. Webster, Oaks Poultry Farm, Horsforth. Feb. 2.
2074 **III. (10*s*.)**—The Countess of Home, The Hirsel, Coldstream. Jan. 3.
2076 **R. N. & H. C.**—J. H. Knowles-Morgan. Jan. 3.
2073 **H. C.**—Robert Fitton. 2075 **Com.**—Holgate & Nortcliffe.

Leghorns.

Class 285.—*White Leghorn Cocks.* [5 entries, 1 absent.]

2085 **I. (30*s*.)**—Wade Bros., Silsden, near Keighley, Yorks.
2086 **II. (15*s*.)**—Mrs. F. M. Webster, Oaks Poultry Farm, Horsforth, Yorks.
2082 **III. (10*s*.)**—R. Coning, Crockey Hill, York. May, 1900.
2084 **R. N. & H. C.**—Frederick Miller, Bryn-Glas, Penarth, Glam.

Class 286.—*White Leghorn Hens.* [8 entries, 1 absent.]

2091 **I. (30*s*.)**—Stanbury Bros., Little Gate Farm, Paignton, Devon.
2094 **II. (15*s*.)**—Mrs. F. M. Webster, Oaks Poultry Farm, Horsforth, Yorks.
2093 **III. (10*s*.)**—Wade Bros., Silsden, near Keighley, Yorks.
2088 **R. N. & H. C.**—R. Coning, Crockey Hill, York. April, 1900.
2087 **H. C.**—The Rev. R. Chichester. 2092 **Com.**—Darcy E. Taylor.

Class 287.—*Leghorn Cocks, any other colour.* [6 entries, 1 absent.]

2100 **I. (30*s*.)**—Mrs. W. O. Smethurst, Oak Villas, Elton, Bury, Lancs.
2098 **II. (15*s*.)**—Col. S. Sandbach, Hafodunos, Abergele, Denbigh. 1900.
2097 **III. (10*s*.)**—John Hurst, South Terrace, Glossop. Over 1 year.
2099 **R. N. & H. C**—E. Ll. Simon, Main Street, Pembroke. March 30, 1900.
2095 **Com.**—W. J. de Salis.

Class 288.—*Leghorn Hens, any other colour.* [7 entries, none absent.]

2105 **I. (30*s*.)**—John Hurst, South Terrace, Glossop. Over 1 year.
2106 **II. (15*s*.)**—Mrs. W. O. Smethurst, Oak Villas, Elton, Bury, Lancs.
2104 **III. (10*s*.)**—Mrs. Higginson, Berrington Road, Tenbury, Worcs. 1900.
2103 **R. N. & H. C**—W. J. de Salis, 40 Booth Street, Handsworth.
2102 **H. C.**—John Dennis 2101 **Com.**—Robert Clayton.

Class 289.—*Leghorn Cockerels, any colour.* [8 entries, 2 absent.]

2115 **I. (30*s*.)**—Mrs. F. M. Webster, Oaks Poultry Farm, Horsforth, Yorks.
2108 **II. (15*s*.)**—R. Coning, Crockey Hill, York. Jan. 19.
2111 **III. (10*s*.)**—Evan Ellis Roberts, 29 Grove Terrace, Penarth, Glam.
2114 **R. N. & H. C.**—Wade Bros., Silsden, nr. Keighley, Yorks.
H. C.—Evan Ellis Roberts, for No. 2110; J. Reader, for No. 2112.

Class 290.—*Leghorn Pullets, any colour.* [12 entries, 3 absent.]

2123 **I. (30*s*.)**—Evan Ellis Roberts, 29 Grove Terrace, Penarth. Jan. 15.
2125 **II. (15*s*.)**—Darcy E. Taylor, The Rocks, Marshfield, Glos. Jan. 26.
2116 **III. (10*s*.)**—Robert Chippindale, Hampson Green, Ellel, Lancaster.
2122 **R. N. & H. C.**—Evan Ellis Roberts, 29 Grove Terrace, Penarth, Glam.
H. C.—R. Coning, for No. 2117; Wade Bros., for No. 2126.
Com.—Helme Bros., for No. 2118; Marshall & Bayley, for No. 2119.

Andalusians.

Class 291.—*Andalusian Cocks or Cockerels.* [5 entries.]

2131 **I. (30*s*.)**—Frederick Porter, High Street, Bridgwater. June 16, 1900.
2130 **II. (15*s*.)**—Frederick Porter. June 6, 1900.
2129 **III. (10*s*.)**—W. H. Bourne, Golden Grove, Chester. April, 1900.
2128 **R. N. & H. C.**—Abbot Bros, Thuxton, Norfolk. 1900.
2132 **Com.**—William Robinson.

Class 292.—*Andalusian Hens or Pullets.* [5 entries.]

2134 **I. (30*s.*)**—W. H. Bourne, Golden Grove, Chester. April, 1900.
2137 **II. (15*s.*)**—R W. R. Wright, Gilsland Vicarage, Carlisle. May 25, 1899.
2133 **III. (10*s.*)**—Abbot Bros., Thuxton, Norfolk. 1900.
2135 **R. N. & H. C.**—Frederick Porter, High Street, Bridgwater.
2136 **H. C.** –Col. S. Sandbach.

Hamburghs.

Class 293.—*Hamburgh Cocks or Cockerels, any variety.* [9 entries, 1 absent.]

2144 **I. (30*s.*)**—H. Pickles, Kayfield House, Earby, Colne, Yorks.
2143 **II. (15*s.*)**—D. Warren Lewis, 11 Richmond Terrace, Carmarthen.
2140 **III. (10*s.*)**—George Doble, Clarence Villa, Bridgwater. 1900.
2139 **R. N. & H. C.**—Viscount Deerhurst, Birlingham House, Pershore.
H. C.—The Rev. Seymour Ashwell, for No. 2138; Wakefield & Elliott, for No. 2146.

Class 294.—*Hamburgh Hens or Pullets, any variety.* [9 entries, none absent.]

2148 **I. (30*s.*)**—George Doble, Clarence Villa, Bridgwater. 1900.
2150 **II. (15*s.*)**—Hy. Pickles, Kayfield House, Earby, Colne, Yorks.
2153 **III. (10*s.*)**—Darcy E. Taylor, The Rocks, Marshfield, Glos. 1900.
2152 **R. N. & H. C.**—Wm. Snell, 129 High Street, Crediton, Devon.
2147 **H. C.**—W. H. Avery.

Any Other Recognised Breeds (Bantams excepted).

Class 295.—*Cocks.* [10 entries, 2 absent.]

2157 **I. (30*s.*)**—Fred Anderton, Sawley Grange, Skipton, Yorks. (Spanish.)
2162 **II. (15*s.*)**—Thomas Milner, Little Marton, Blackpool. (Malay.)
2159 **III. (10*s.*)**—George Doble, Clarence Villa, Bridgwater. (Spanish.) 1900.
2161 **R. N. & H. C.**—Alex. Frew, Ynysawdre, Aberkenfig, Glam. (Aseel.)
2165 **H. C.**—John Smith. (Spanish.)
2158 **Com.**—Mrs. C. H. Bourlay. (Ancona.)

Class 296.—*Hens.* [10 entries, 2 absent.]

2174 **I. (30*s.*)**—John Powell, Myrtle Royd, Bingley, Yorks. (Spanish.) 1899.
2166 **II. (15*s.*)**—Abbot Bros., Thuxton, Norfolk. (Spanish.) 1900.
2171 **III. (10*s.*)**—Thomas Milner, Little Marton, Blackpool. (Malay.)
2170 **R. N. & H. C.**—A. S. Hiscock, Brookfield, Trowbridge. (Aseel.) 1900.
H. C.—Fred Anderton, for No. 2168 (Spanish); Geo. Doble, for No. 2169 (Spanish); John Smith, for No. 2175 (Spanish).

Class 297.—*Cockerels.* [4 entries, 1 absent.]

2178 **I. (30*s.*)**—Thomas Milner, Little Marton, Blackpool. (Malay.) Jan. 6.
2177 **II. (15*s.*)**—Mrs. D. Mackenzie, Maryfield, Meigle, Perthshire. (Spanish.) Jan. 11.
2176 **III. (10*s.*)**—Fred Anderton, Sawley Grange, Skipton, Yorks. (Spanish.)

Class 298.—*Pullets.* [5 entries, 1 absent.]

2180 **I. (30*s.*)**—Fred Anderton, Sawley Grange, Skipton, Yorks. (Spanish.)
2182 **II. (15*s.*)**—Thomas Milner, Little Marton, Blackpool. (Malay.) Jan. 6.
2181 **III. (10*s.*)**—Robert Fitton, Ribby Hall, Kirkham. (Modern Game.)

DUCKS.

Aylesbury.

Class 299.—*Aylesbury Drakes.* [6 entries, 1 absent.]

2190 **I.** (30*s.*)—F. Read, Aston Clinton, near Tring, Bucks. 1899.
2189 **II** (15*s.*)—The Countess of Home, The Hirsel, Coldstream. 1 year.
2187 **III.** (10*s.*)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, near Cardiff. 1900.
2186 **R. N. & H. C.**—J. Davies, The Maypole, Rhiwderin, Newport, Mon.
2185 **H. C.**—William Bygott.

Class 300.—*Aylesbury Ducks.* [7 entries, 1 absent.]

2197 **I.** (30*s.*)—F. Read, Aston Clinton, near Tring, Bucks. 1899.
2193 **II.** (15*s.*)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, Cardiff. 1899.
2191 **III.** (10*s.*)—Wm. Bygott, Ryehill House, Ulceby, Lincs. 1900.
2194 **R. N. & H. C.**—Dr. F. Rutherfoord Harris, Llangibby Castle, Usk.
2196 **H. C.**—The Countess of Home.

Class 301.—*Aylesbury Young Drakes.* [3 entries.]

2199 **I.** (30*s.*)—F. Read, Aston Clinton, near Tring, Bucks. April 9.
2198 **II.** (15*s.*)—The Countess of Home, The Hirsel, Coldstream. Feb. 4.
2200 **R. N. & H. C.**—Wm. Weston, 31 Mount Street, Aylesbury, Bucks.

Class 302.—*Aylesbury Ducklings.* [3 entries.]

2202 **I.** (30*s.*)—F. Read, Aston Clinton, near Tring, Bucks. April 9.
2201 **II.** (15*s.*)—The Countess of Home, The Hirsel, Coldstream. Feb. 4.
2203 **R. N. & H. C.**—Wm. Weston, 31 Mount Street, Aylesbury, Bucks.

Rouen.

Class 303.—*Rouen Drakes.* [7 entries, none absent.]

2206 **I.** (30*s.*)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, near Cardiff. 1899.
2210 **II** (15*s.*)—T. G. Steer, Prestbury, Cheshire. 1900.
2209 **III.** (10*s.*)—A. T. & H. Pears, Mere, Lincoln.
2205 **R. N. & H. C**—Wm. Bygott, Ryehill House, Ulceby, Lincs.

Class 304.—*Rouen Ducks.* [10 entries, none absent.]

2212 **I.** (30*s.*)—Henry W. Bell, Caville Hall, Howden, Yorks. April, 1899.
2215 **II.** (15*s*), & 2214 **III.** (10*s.*)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, near Cardiff.
2211 **R. N. & H. C.**—Henry W. Bell.
H. C.—Wm. Bygott, for No. 2213; Wm. Longson, for No. 2218.
2220 **Com.**—A. T. & H. Pears.

Pekin.

Class 305.—*Pekin Drakes.* [4 entries.]

2222 **I.** (30*s.*)—F. A. Miles, Park Farm, Boughton Aluph, Ashford, Kent.
2224 **II.** (15*s.*)—Owen Phillips, Bredon Lodge, near Tewkesbury.
2223 **R. N. & H. C**—Percy Percival, Somerset Court, Brent Knoll, Somerset.
2221 **H. C.**—A. S. Hiscock.

Class 306.—*Pekin Ducks.* [4 entries, none absent.]

2228 I. (30*s.*)—Owen Phillips, Bredon Lodge, near Tewkesbury.
2227 II. (15*s.*)—Percy Percival, Somerset Court, Brent Knoll, Somerset.
2226 R. N. & H. C.—Francis A. Miles, Park Farm, Boughton Aluph, Ashford.

Cayuga.

Class 307.—*Cayuga Drakes.* [3 entries.]

2231 I. (30*s.*)—Percy Percival, Somerset Court, Brent Knoll, Somerset.
2230 II. (15*s.*)—Viscount Deerhurst, Birlingham House, Pershore. 1899.
2229 R. N.—The Hon. Sybil Amherst, Didlington Hall, Brandon, Norfolk.

Class 308.—*Cayuga Ducks.* [1 entry.]

2232 I (30*s.*)—The Hon. Sybil Amherst, Didlington Hall, Brandon Norfolk.

Any Breeds. (*Aylesburys excepted.*)

Class 309.—*Young Drakes.* [5 entries, none absent.]

2235 I. (30*s*)—Wm. Longson, Walton, nr. Stafford (Rouen.) March 10.
2237 II. (15*s.*)—Percy Percival, Somerset Court, Brent Knoll. (Pekin.)
2233 R. N. & H. C.—Wm. Bygott, Ryehill House, Ulceby, Lincs. (Rouen.)

Class 310.—*Ducklings.* [4 entries, none absent.]

2239 I. (30*s.*)—Wm. Longson, Walton, nr. Stafford. (Rouen.) March 28.
2241 II. (15*s.*)—Percy Percival, Somerset Court, Brent Knoll. (Pekin.)
2238 R. N. & H. C.—Wm. Bygott, Ryehill House, Ulceby, Lincs. (Rouen.)

Geese.

Class 311.—*Embden Ganders.* [7 entries, none absent.]

2243 I. (£2.)—Abbot Bros., Thuxton, Norfolk. 1899.
2247 II. (£1.)—Henry T. Goodenough, Milton Common, Great Milton, Wallingford, Berks. Feb. 27, 1896.
2246 III. (10*s.*)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, near Cardiff. 1898.
2248 R. N. & H. C.—W. D. Wedgewood. 2245 H. C.—Henry W. Bell.

Class 312.—*Embden Geese.* [8 entries, none absent.]

2253 I. (£2.)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, near Cardiff. 1899.
2250 II. (£1.), & 2249 III. (10*s.*)—Abbot Bros., Thuxton, Norfolk. 1899.
2252 R. N. & H. C.—Henry W. Bell, Caville Hall, Howden, Yorks.

Class 313.—*Toulouse Ganders.* [2 entries.]

2257 I. (£2.)—Wm. Bygott, Ryehill House, Ulceby, Lincs. 1900.
2258 R. N. & H. C.—Leolin Forestier-Walker.

Class 314.—*Toulouse Geese.* [2 entries.]

2260 I. (£2)—Leolin Forestier-Walker, Park House, Michaelstone-y-Vedw, near Cardiff. 1898.
2259 R. N.—Wm. Bygott, Ryehill House, Ulceby, Lincs. 1900.

Turkeys.

Class 315.—*Turkey Cocks.* [9 entries, none absent.]

2267 I. (£2.)—WM. JOHNSON, Rushbury, Church Stretton. (American Bronze.)
2265 II. (£1.)—DR. F. RUTHERFOORD HARRIS, Llangibby Castle, Usk, Mon. (American Bronze.)
2264 III. (10*s*.)—HENRY T. GOODENOUGH, Milton Common, Great Milton, Wallingford. (American Mammoth.) May, 1900.
2263 R. N. & H. C.—EDWARD DAVID EDWARDS. (American Bronze.)
H. C.—ABBOT BROS., for No. 2261; JOHN MORGAN, for No. 2268; W. D. WEDGEWOOD, for No. 2269.

Class 316.—*Turkey Hens.* [7 entries, 1 absent.]

2272 I. (£2), & 2271 R. N. & H. C.—ABBOT BROS., Thuxton, Norfolk. (Bronze.) 1900.
2274 II. (£1.)—HENRY T. GOODENOUGH, Milton Common, Great Milton, Wallingford. (American Mammoth.) May, 1898.
2273 III. (10*s*.)—RADZIVILL F. FORESTIER-WALKER, Stansbatch, Staunton-on-Arrow, Herefordshire. (Bronze.) May, 1899.
2270 H. C.—ABBOT BROS. 2275 Com.—COL. S. SANDBACH.

FARM AND DAIRY PRODUCE OF THE UNITED KINGDOM.

Butter.

Class 317.—*Kegs or other Packages of Butter, not less than* 14 *lb. and under* 40 *lb. in weight, delivered on or before Saturday, May* 11*th*, 1901. [10 entries, none absent.]

2281 I. (£5.)—C. HAYES, Keyford House Farm, Frome. (Cross-bred Cows: Cream raised in shallow pans, churned at 54° F, dry salted. May 10.)
2283 II. (£3.)—NEWTOWNSANDES CO-OPERATIVE DAIRY SOCIETY, LTD., Newtownsandes, co. Kerry. (Mixed breeds of Shorthorn and Ayrshire Cows: Cream separated by centrifugal force, and ripened in Swartz cans, churned at 54° F., salted in grain with 3 per cent. salt. May 8.)
2279 R. N. & H. C.—DRUMCLIFFE CO-OPERATIVE DAIRY SOCIETY, LTD., Drumcliffe, co. Sligo. (Cross-bred Shorthorn Cows: Cream separated by centrifugal force, churned at 46° F., brined in churn, and drysalted in working. May 7.)

Class 318.—*Boxes of twelve two-pound rolls of Butter, made with not more than* 1 *per cent. of salt.* [22 entries, 2 absent.]

2295 I. (£5.)—FENNOR CO-OPERATIVE DAIRY SOCIETY, LTD., Gortnahoe, Thurles, co. Tipperary.
2299 II. (£3.)—HOWARDSTOWN DAIRY CO., Bruree, co. Limerick.
2305 III. (£1.)—MISS MABEL G. PRIDEAUX, The Grange, Motcombe, Dorset.
2293 R. N. & H. C.—DOBBIN'S CREAMERY CO, 6 St. Katherine's Gate, E.
Com.—MISS LETTICIA DAVIES, for No. 2291; GLENWILLIAM CO-OPERATIVE DAIRY SOCIETY, LTD., for No. 2297; KILLYMAN CO-OPERATIVE AGRICULTURAL & DAIRY SOCIETY, LTD., for No. 2301.

Class 319.—*Two pounds Fresh Butter, slightly salted, made up in pounds.* [71 entries, 4 absent.]

2323 (£3.)—Antony Gibbs, Tyntesfield, Bristol.
2371 (£3.)—Miss Urwin, Dunskins, Wolsingham, co. Durham.
2373 (£3.)—Mrs. Frank Ward, Burnville, Tavistock, Devon.
2379 (£3.)—Miss M. E. Wyles, Bassingfield, Nottingham.
2325 (£2.)—Charles Hayes, Keyford House Farm, Frome, Somerset.
2338 (£2.)—Major-General H. H. Lee, The Mount, Dinas Powis, Cardiff.
2353 (£2.)—The Hon. Mrs. Portman, Hestercombe, Taunton.
2359 (£2.)—Lord Rothschild, Tring Park, Tring, Herts.
2341 (£1.)—Mrs. Charlotte McIntosh, Havering Park, Romford, Essex.
2351 (£1.)—Mrs. J. H. Phillips, Winsford Dairy, Bideford, N. Devon.
2352 (£1.)—Lord Poltimore, Poltimore Park, Exeter.
2368 (£1.)—Alfred Thomas, Glanrynis, Kidwelly, Carmarthenshire.
H. C.—A. E. Burnaby, for No. 2313; Henry Clay, for No. 2314; Mrs. L. R. Mildon, for No. 2343; G. Murray Smith, for No. 2363.
Com.—Charles E. Keyser, for No. 2335; H. Tresyllian Williams, for No. 2377; Lord Windsor, for No. 2378.

Class 320.—*Two pounds Fresh Butter, slightly salted, made up in pounds, from Milk drawn from Cows other than Channel Islands or Cows crossed with Channel Islands Breeds.* [51 entries, none absent.]

2413 (£3.)—Mrs. J. H. Phillips, Winsford Dairy, Bideford, N. Devon.
2414 (£3.)—Lord Poltimore, Poltimore Park, Exeter.
2418 (£3.)—The Earl of Rosebery, K.G., Mentmore, Leighton Buzzard.
2423 (£3.)—Alfred Thomas, Glanrynis, Kidwelly, Carmarthenshire.
2391 (£2.)—Antony Gibbs, Tyntesfield, Bristol.
2404 (£2.)—Mrs. L. R. Mildon, Higher Mead Down, Morchard Bishop, Devon.
2422 (£2.)—Miss S. S. Sparrow, Ellis's Farm, Hardwicke, Gloucester.
2424 (£2.)—William G. M. Townley, Hard Cragg, Grange-over-Sands.
2393 (£1.)—Charles Hayes, Keyford House Farm, Frome, Somerset.
2396 (£1.)—The Hon. A. Holland-Hibbert, Munden, Watford, Herts.
2410 (£1.)—Miss Nellie Parker, The Hill Farm, Trostrey, Usk, Mon.
2430 (£1.)—John Wesley, Grove House, Stretham, Ely.
H. C.—Mrs. M. A. Lougher, for No. 2403; Col. the Hon. F. C. Morgan, M.P., for No. 2406; Miss Urwin, for No. 2425; J. H. Walker, for No. 2426
Com.—Miss Janet James, for No. 2399; Mrs. J. E. Shepherd, for No. 2421.

Cheese.

Class 321.—*Three Cheddar Cheeses, of not less than* 50 *lb. each, made in* 1901. [12 entries, none absent.]

2438 I. (£8.)—F. W. J. Crocker, Batcombe, Cattistock, Dorchester.
2442 II. (£5.)—Harry Travers, Church Farm, Steeple Ashton, Trowbridge.
2436 III. (£3.)—Henry Cannon, Milton Clevedon, Evercreech, Bath.
2439 IV. (£1.)—E. T. Green, Steeple Ashton, Trowbridge.
2435 R. N. & H. C.—T. C. Candy. 2432 H. C.—Henry G. Ashman.

Class 322.—*Three Cheshire Cheeses, of not less than* 40 *lb. each, made in* 1901. [9 entries, none absent.]

2446 I. (£8.)—William Dutton, Brindley Hall, Nantwich, Cheshire.
2444 II. (£5.)—Thomas Batho, New Marton, Chirk, Ruabon.
2447 III. (£3.)—Miss J. Forster, Dairy Institute, Worleston, Nantwich

Class 323.—*Three Stilton Cheeses, made in* 1901. [10 entries, none absent.]

2458 I. (£5.)—JOHN SMITH, Gaddesby, near Leicester.
2456 II. (£3.)—E. T. MOORE, Beeby, Leicester..
2459 III (£2.)—Y. G. VEEN, Harby, Melton Mowbray.
2455 **R. N. & H. C.**—A. W. HURST. 2453 **H. C.**—MRS. C. FAIRBROTHER.

Class 324.—*Three Wensleydale Cheeses (Stilton Shape), made in* 1901. [5 entries, 1 absent.]

2463 I. (£5.)—WILLIAM MASON, Swinethwaite, Leyburn, R.S.O., Yorkshire.

Class 325.—*Three Double Gloucester Cheeses, made in* 1901. [5 entries, none absent.]

2467 I. (£5.)—E .L. T. AUSTEN, Wolford Fields, Shipston-on-Stour.
2469 II. (£3.)—C. HARRIS AND SON, Rectory Farm, Shinbridge, Stonehouse.
2471 III. (£2.)—MRS. W. T. S. TILLEY, East Compton, Shepton Mallet.

Class 326.—*Three Wiltshire Cheeses (Loaf or Flat), not exceeding* 16 *lb. each, made in* 1901. [7 entries, none absent.]

2475 I. (£5.)—EDMUND T. GREEN, Steeple Ashton, Trowbridge, Wilts.
2478 II. (£3.)—MRS. W. T. S. TILLEY, East Compton, Shepton Mallet.
2472 III. (£2.)—JOHN ASHBY, Spiers Piece Farm, Steeple Ashton, Trowbridge.
2473 **R. N. & H. C.**—E. T. L. AUSTEN. 2474 **H C.**—E. M. COLES.

Class 327.—*Three Caerphilly Cheeses, not less than* 10 *lb. each, above* 3 *and not exceeding* 4 *inches in thickness.*[1] [9 entries, none absent.]

2487 I. (£5.)—MRS. JOHN WILLIAMS, Barn Farm, Llanwern, Newport, Mon.
2484 II. (£3.)—MISS NELLIE THOMAS, Towyn Farm, Pembrey, Carmarthen.
2480 III. (£2)—EDWARD DIBBLE, Brean, Burnham, Somerset.
2479 **R. N. & H. C.**—J. BOARD, East Pennard, Shepton Mallet, Somerset.

Class 328.—*Three Caerphilly Cheeses, not less than* 8 *lb. each, not exceeding* 3 *inches in thickness.*[1] [12 entries, 1 absent.]

2499 I. (£5.)—MRS. JOHN WILLIAMS, Barn Farm, Llanwern, Newport, Mon.
2496 II. (£3.)—MISS ANNIE THOMAS, Penybedd, Burry Port, Carmarthenshire.
2495 III. (£2.)—ALFRED THOMAS, Glanrynis, Kidwelly, Carmarthenshire.
2492 **R. N. & H. C.**—MRS C. EDWARDS, Cefn Poeth, Llanedarne, Cardiff.

Class 329.—*Three Cheeses, of any other British make, made in* 1901. (*Cream Cheeses excepted*). [8 entries, none absent.]

2500 I. (£5.)—H. G. ASHMAN, Beacon Farm, Shepton Mallet. (Cheddar Loaf.)
2507 II. (£3.)—MRS. W. T. S. TILLEY, East Compton, Shepton Mallet. (Cheddar Loaf.)
2501 III. (£2.)—E. L. T. AUSTEN, Wolford Fields, Shipston-on-Stour. (Somerset Loaf.)
2505 **R. N. & H. C.**—C. W. PROUT. (Single Gloucester.)
2504 **H. C.**—C. HARRIS AND SON. (Truckle.)

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[1] Prizes given by the Cardiff Local Committee.

CIDER AND PERRY.

N.B.—The names of the Fruits from which the Cider or Perry is stated by the Exhibitor to have been made are added after the address of the Exhibitor In classes 332 and 333 the date of making is also given.

Class 330.—*Casks of Cider, of not less than* 18, *and not more than* 30 *gallons made in the autumn of* 1900. [29 entries, 1 absent.]

2508 **I. (£5.)**—W. T. Allen, Bradley House, near Glastonbury, Somerset. (Red Jersey, Norton's, Bitters and Gins.)

2529 **II. (£3.)**—W. T. S. & H. A. Tilley, East Compton, Shepton Mallet, Somerset. (Kingston Blacks, Red Jerseys, Gins and Horners.)

2535 **III. (£2.)**—John H. Wootton, Byford, Hereford. (Redstreak.)

2536 **R. N. & H. C.**—Yeomans Bros. (Kingston Black.)

2530 **H. C.**—W. T. S. & H. A. Tilley.

Com.—John Bazley, for No. 2511; Swanley Cyder Co, for No. 2526; J. C. Waterman & Son, for Nos. 2531 & 2532; Watkins' Pomona Cider Co., Ltd., for Nos. 2533 & 2534.

Class 331.—*One Dozen Bottles of Cider, made in the autumn of* 1900. [42 entries, none absent.]

2558 **I. (£5.)**—R. Rout & Son, Banham, Attleboro', Norfolk. (Blenheim Orange, Ribstone, and Fillbasket.)

2568 **II. (£3.)**—W. T. S. & H. A. Tilley, East Compton, Shepton Mallet. (Kingston Blacks, Red Jerseys, Gins and Horners.)

2571 **III. (£2.)**—J. C. Waterman & Son, Baltonsborough, Glastonbury. (Kingston Black, Bitter Scale, King of Jerseys, and Blenheim Orange.)

2578 **R. N. & H. C.**—Yeomans Bros., Canon Pyon, Hereford. (Kingston Black.)

H. C.—W. T. Allen, for No. 2538; Herbert J. Davis, for No. 2548; R. Rout & Son, for No. 2559; W. T. S. & H. A. Tilley, for No. 2567.

Com.—W. T. Allen, for No. 2537; Herbert J. Davis, for No. 2547; Frank Richard Mailes, for No. 2552; William Parry, for No. 2554.

Class 332 —*One Dozen Bottles of Cider, made in any year before* 1900. [29 entries, none absent.]

2603 **I. (£5.)**—W. T. S. & H. A. Tilley. East Compton, Shepton Mallet. (Red Jerseys, Kingston Blacks, New Cadburys, and Doves, 1899.)

2586 **II. (£3.)**—Herbert J. Davis, Hurlingpot, Shepton Mallet. (Red Chisel and White Jerseys, Horners, Kingston Blacks, and Cap of Liberty, 1899.)

2598 **III. (£2.)**—The Rev. E. P. Spurway, Heathfield Rectory, Taunton. (Kingston Black, 1899.)

2607 **R. N. & H. C.**—Yeomans Bros., Canon Pyon, Hereford. (Foxwhelp and Strawberry Norman, 1899.)

2602 **H.C.**—W. T. S. & H. A. Tilley.

Com.—John Bazley, for No. 2581; John Bosley, for No. 2583; James Slatter & Co., for No. 2596; Watkins' Pomona Cider Co., Ltd., for No. 2605.

Class 333.—*One Dozen Bottles of Perry.* [18 entries, none absent.]

2622 **I. (£5.)**—Henry Thomson, Southends, Newent, Glos. (Oldfield, 1900.)

2610 **II. (£3.)**—Henry Godwin & Son, Holmer, Hereford. (Holmer, 1899.)

2617 **III. (£2.)**—Daniel Phelps, Tibberton, Gloucester. (Oldfield, 1898.)

2619 **R. N. & H C.**—James Slatter & Co. 2621 **H.C.**—Henry Thomson.

Com.—Henry Godwin & Son, for No. 2611; Watkins' Pomona Cider Co., Ltd., for No. 2624; Yeomans Bros., for No. 2625.

HIVES, HONEY, AND BEE APPLIANCES.[1]

Appliances.

Class 334.—*Collections of Hives and Appliances.* [5 entries, none absent.]

2628 **I.** (£4.)—R. H. Coltman, 49 Station Street, Burton-on-Trent.
2630 **II.** (£2.)—W. P. Meadows, Syston, Leicester.
2629 **III.** (£1.)—Jas. Lee & Son, 10 Silver Street, High Holborn, W.C.
2627 **R. N. & H. C.**—J. T. Burgess and Son, 10 and 11 Guinea Street, Exeter

Class 335.—*Outfits for Beginners in Bee-keeping.* [11 entries, none absent.]

2637 **I.** (£1.)—Jas. Lee & Son, 10 Silver Street, High Holborn, W.C.
2633 **II.** (15*s.*)—J. T. Burgess and Son, 10 and 11 Guinea Street, Exeter.
2639 & 2641 **III.** (10*s.*)—E. H. Taylor, Welwyn, Herts.
2638 **R. N.**—W. P. Meadows, Syston, Leicester.

Class 336.—*Observatory Hives not exceeding three Frames with Bees and Queen.* [2 entries, none absent.]

2643 **I.** (£1.)—Jas. Lee & Son, 10 Silver Street, High Holborn, W.C.

Class 337.—*Frame Hives for general use, unpainted.* [16 entries, none absent.]

2652 **I.** (£1.)—Jas. Lee & Son, 10 Silver Street, High Holborn, W.C
2654 **II.** (15*s.*)—W. P. Meadows, Syston, Leicester.
2650 **III.** (10*s.*)—J. Greenhill, 80 Graham Road, Wimbledon.
2651 **R. N.**—T. Lanaway & Sons, 70 Station Road, Redhill.

Class 338.—*Frame Hives for Cottagers' use, unpainted.* [15 entries, none absent.]

2670 **I.** (£1.)—W. P. Meadows, Syston, Leicester.
2669 **II.** (15*s.*)—Jas. Lee & Son, 10 Silver Street, High Holborn, W.C.
2672 **III.** (10*s.*)—E. H. Taylor, Welwyn, Herts.
2671 **R. N. & H. C.**—W. P. Meadows.
H. C.—R. H. Coltman, for Nos. 2665 & 2666; J. Greenhill, for No. 2667

Class 339.—*Honey Extractors.*[2] [11 entries, none absent.]

2681 **I.** (15*s.*)—W. P. Meadows, Syston, Leicester.
2684 **II.** (10*s.*)—E. H. Taylor, Welwyn, Herts.
2678 **R. N. & H. C.**—J. T. Burgess & Son, 10 and 11 Guinea Street, Exeter.
2682 **H. C.**—W. P. Meadows.

Class 340.—*Any Appliances connected with Bee-keeping, introduced since* 1899. [6 entries, none absent.]

2689 **I.** (10*s.*)—W. P. Meadows, Syston, Leicester. The Rymer Honey Press, on Stand.
2688 **Certificate of Merit.**—Jas. Lee & Son, 10 Silver Street, Bury Street, High Holborn, W.C. New Registered Section Case.
2686 **R. N. & H. C.**—Richard Allen, Tusmore, Bicester. Small Emergency Hive.

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[1] Prizes given by the British Bee-keepers' Association.
[2] Prizes in Class 339 given by Mr. T. W. Cowan.

Honey.

Class 341.—*Twelve Sections of Comb Honey, gathered in* 1901. [18 entries, 5 absent.]

2708 I. (15*s.*)—W. Woodley, Beedon, Newbury.
2696 II. (10*s.*)—R. Brown, Flora Apiary, Somersham, Hunts.
2704 III. (5*s.*)—Harry Seamark, Willingham, Cambs.
2709 R. N. & H. C.—John H. Wootton, Byford, Hereford.
2707 H. C.—E. C. R. White.

Class 342.—*Twelve Sections of Comb Honey, gathered before or in* 1900. [2 entries, none absent.]

2711 I. (10*s.*)—W. Woodley, Beedon, Newbury.

Class 343.—*Twelve Sections of Comb Heather Honey, of any year.* [4 entries, none absent.]

2713 I. (10*s.*)—J. P. W. Lightfoot, Pickering Bee Farm, Pickering, Yorks.
2715 II. (7*s.* 6*d.*)—Jas. Waddell, The Terrace, Wooler, Northumberland.
2712 R. N.—John Berry, The Apiary, Llanrwst, N. Wales.

Class 344.—*Three Shallow Frames of Comb Honey, for Extracting, gathered in* 1901. [7 entries, 3 absent.]

2722 I. (10*s.*)—E. C. R. White, Manor Farm, Newton Toney, nr. Salisbury.
2718 II. (7*s.* 6*d.*)—R. Brown, Flora Apiary, Somersham, Hunts.
2721 III. (5*s.*)—George Wells, Eccles, Aylesford, nr. Maidstone.
2719 R. N.—John Helme, Norton Canon, Weobley, R.S.O., Herefordshire.

Class 345.—*Twelve Jars of Run or Extracted Light-coloured Honey, gathered in* 1901. [15 entries, 2 absent.]

2732 I. (15*s.*)—The Rev. E. R. Iremonger, Goodworth-Clatford Vicarage, Andover.
2724 II. (10*s.*)—Thomas Blake, Broughton, Hants.
2737 III. (5*s.*)—W. Woodley, Beedon, Newbury.
2725 R. N. & H. C.—Joseph Boyes.
H. C.—R. Brown, for No. 2726; F. Chapman, for No. 2727; W. G. Dear, for No. 2729.
2728 Com.—Andrew Curnow.

Class 346.—*Twelve Jars of Run or Extracted Medium-coloured Honey (free from Heather), gathered in* 1901. [14 entries, 6 absent.]

2750 I. (15*s.*)—Mrs. H. H. Woosnam, Rora, Newton Abbot, Devon.
2744 II. (10*s.*)—G. W. Kirby, Salisbury House, Longwell Green, Bristol.
2751 III. (5*s.*)—John H. Wootton, Byford, Hereford.
2740 R. N.—R. Brown. 2738 Com.—C. A. Atchley.

Class 347.—*Twelve Jars of Run or Extracted Dark-coloured Honey (other than Heather), gathered in* 1901. [2 entries, 1 absent.]

2752 I. (15*s.*)—G. W. Kirby, Salisbury House, Longwell Green, Bristol.

Class 348.—*Twelve Jars of Run or Extracted Honey, gathered before or in* 1900. [6 entries, none absent.]

2756 I. (10*s.*)—F. Chapman, The Dairy, Wells, Somerset.
2754 II (7*s.* 6*d.*)—H. F. Beale, Royston House, Andover.

2758 III. (5*s.*)—John H. Seabrook, Longfield, Kent.
2755 R. N.—The Rev. J. R. Bradshaw, Hessay, York.

Class 349.—*Twelve Jars of Run or Extracted Heather Honey, gathered in* 1900. [4 entries, none absent.]

2760 I. (10*s.*)—John Berry, The Apiary, Llanrwst, N. Wales.
2763 II. (7*s.* 6*d.*)—E. C. R. White, Manor Farm, Newton Toney, nr. Salisbury.
2761 R. N.—G. W. Kirby, Salisbury House, Longwell Green, Bristol.

Class 350.—*Twelve Jars of Granulated Honey, gathered before or in* 1900. [7 entries, 1 absent.]

2770 I. (10*s.*)—W. Woodley, Beedon, Newbury.
2765 II. (7*s.* 6*d.*)—R. Brown, Flora Apiary, Somersham, Hunts.
2768 III. (5*s.*)—J. Hookway, 28 Martin's Buildings, Wellington, Som.
2766 R. N.—P. B. Govett, Tideford, St. Germans, Cornwall.

Class 351.—*Best and most attractive Displays of Honey in any form, and of any year.* [4 entries, none absent.]

2771 I. (30*s.*)—R. Brown, Flora Apiary, Somersham, Hunts.
2773 II. (20*s.*)—James Lee & Son, 10 Silver Street, High Holborn, W.C.
2772 R. N.—R. H. Coltman, 49 Station Street, Burton-on-Trent.

Miscellaneous.

Class 352.—*Exhibits of not less than 3 lb. of Wax, produced by the Exhibitor's own Bees.* [10 entries, none absent.]

2784 I. (10*s.*)—Mrs. H. H. Woosnam, Rora, Newton Abbot, Devon.
2775 II. (7*s.* 6*d.*), & 2776 III. (5*s.*)—J. Berry, The Apiary, Llanwrst, N. Wales.
2781 R. N. & H. C.—John Edwards. 2777 Com.—R. Brown.

Class 353.—*Exhibits of not less than 3 lb. of Wax, produced by the Exhibitor's own Bees.* [6 entries, none absent.]

2786 I. (10*s.*), & 2785 II. (7*s.* 6*d.*)—J. Berry, The Apiary, Llanwrst, N. Wales.
2787 III. (5*s.*)—R. Brown, Flora Apiary, Somersham, Hunts.
2789 R. N.—John Edwards.

Class 354.—*Half-gallons of Honey Vinegar.* [1 entry.]

2791 I. (7*s.* 6*d.*)—G. W. Kirby, Salisbury House, Longwell Green, Bristol.

Class 355.—*Half-gallons of Mead.* [2 entries.]

2793 I. (7*s.* 6*d.*)—Lawrence Hill, 7 Falmouth Road, Sheffield.
2792 II. (5*s.*)—John Bradley, Stoney Stretton, Yockleton, Shrewsbury.

Class 356.—*Interesting and instructive Exhibits of a Practical Nature connected with Bee-culture, not mentioned in the foregoing Classes.* [1 entry.]

2794 I. (10*s.*)—Richard Allen, Tusmore, Bicester. Super of Honey.

Class 357.—*Interesting and instructive Exhibits of a Scientific Nature, not mentioned in the foregoing Classes.* [3 entries.]

2796 I. (10*s.*)—James Lee and Son, 10 Silver Street, High Holborn, W.C.
2795 Certificate of Merit —James Lee & Son. 2797 R. N.—F. W. L. Sladen.

IMPLEMENTS.

Class I.—*Portable Oil Engines.* [8 entries, 2 absent.]

2108 **I. (£40.)**—Crossley Brothers, Ltd., Openshaw, Manchester: for Improved Patent oil engine, 15 B.H.P., with exhaust-box, silencer, wrought-iron travelling wheels, and automatic lubricator. *Price* £250.

2114 **II. (£20.)**—Ruston, Proctor & Co., Ltd., Lincoln: for oil engine, portable, 12 B.H.P., with friction clutch; adapted for general farm purposes. *Price* £290.

Class II.—*Agricultural Locomotive Oil Engines.*

[No Entries.]

Class III.—*Small Ice-making Plant, suitable for a Dairy.*

4070 **Prize of £15.**—J. & E. Hall, Ltd., Dartford: for Ice-making Machine using Carbonic Anhydride, arranged with Ice Tank and Rocking Moulds. *Price* £130.

Silver Medals.

For Articles entered as "New Implements for Agricultural or Estate Purposes."

[No Awards.]

BUTTER-MAKING COMPETITIONS.

Class 1.—*Persons who have received instruction in the Glamorganshire Dairy School.*[1] [14 entries.]

3 **I. (£5.)**—Miss Janet James, Blaen Baglan Farm, Briton Ferry, Glam.
7 **II. (£3.)**—Miss Jane Lougher, Sheep Court, Bonvilston, Cardiff.
14 **III. (£2.)**—Mrs. Mary Watts, Sheep Court, Bonvilston, Cardiff.
4 **IV. (£1.)**—Miss Agnes Jones, Blaennant Farm, Pontardawe, Glam.
6 **R. N. & H. C.**—Miss Edith Mary Lougher, Llanvithyn House, Llanvithyn, Cowbridge, Glam.
8 **H. C.**—Miss Annie Morgan, Torycoed Farm, Crossvane, Pontyclun, Glam.
13 **H. C.**—Miss Alice Cecil Thomas, Moorshead, Cowbridge, Glam.
1 **Com.**—Miss Gladys Board, Sheep Leys Farm, Lisworney, Cowbridge.
2 **Com.**—Miss Mary Edwards, Cefn Poeth, Llanedarne, Cardiff.
5 **Com.**—Miss Anne Jones, Newton Farm, Cowbridge, Glam.
9 **Com.**—Miss Mary Jane Morris, Cefn Llwyd, Michaelston-y-fedw.
10 **Com.**—Miss Mary Rees, Green Meadow, Michaelston-y-fedw, Cardiff.
11 **Com.**—Miss Maggie Roberts, Malthouse Farm, Llanedeyrn, Cardiff.
12 **Com**—Miss Amy Ann Thomas, Tynyberllan Farm, Llanedarne, Cardiff.

Class 2.—*Persons who have received instruction in the Monmouthshire Dairy School.*[1] [21 entries, none absent.]

15 **I. (£5.)**—Miss Edith Biddle, The Laurels, St. Arvans, Chepstow, Mon.
16 **II. (£3.)**—Miss Emily M. Cox, Pwllpen, Christchurch, Newport, Mon.
18 **III. (£2.)**—Mrs. Quinton Dick, Panta Farm, Chepstow, Mon.
33 **IV. (£1.)**—Miss Edith Annie Pritchard, Coed Ithel Farm, Llandogo.
17 **R. N. & H. C.**—Miss Frances S. Cox, Pwllpen, Christchurch, Newport.
19 **H. C.**—Miss Edith Edwards, The Beaulieu Farm, Monmouth.
27 **H. C.**—Miss Ellen Mary Knight, Slough Farm, Caerwent, Chepstow.

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[1] Prizes given by the Cardiff Local Committee.

28 **H. C.**—Miss Mary Hannah M'Creadie, Treher Farm, Bedwas, Mon.
29 **H. C.**—Miss Nellie Parker, The Hill Farm, Trostrey, Usk, Mon.
31 **H. C.**—Miss Bessie Powell, Little Castle, Usk, Mon.
35 **H. C.**—Miss S. A. Williams, Llanvihangel, Crucorney, Abergavenny.
20 **Com.**—Miss Edith Herbert, Llanerthill, Usk, Mon.
21 **Com.**—Miss Florence Herbert, Llanerthill, Usk, Mon.
22 **Com.**—Miss Elizabeth James, Llancayo Farm, Usk, Mon.
23 **Com.**—Miss Margaretta James, Llancayo Farm, Usk, Mon.
25 **Com.**—Miss Ethel M. Jones, The Orchard, Raglan, Mon.
26 **Com.**—Miss Margaret Jones, Ruperra Castle, Newport, Mon.
30 **Com.**—Miss Janie Polsue, The Bungalow, Raglan, Newport, Mon.
32 **Com.**—Miss Alice Pritchard, Coed Ithel Farm, Llandogo, Chepstow.
34 **Com.**—Miss Sarah Rees, Prioress Mills, Usk, Mon.

Class 3.—*Dairymen, Dairymaids, or Members of a Farmer's Family, resident in the Society's District F, consisting of the counties of Gloucester, Hereford, Monmouth, Salop, Stafford, Warwick, Worcester, and South Wales.*[1]

[26 entries, none absent.]

61 **I. (£5.)**—Miss Emmie Woolfe, Hungerford House, Madeley, Staffs.
52 **II. (£3.)**—Miss Jessie Stubbs, Highfields, Stafford.
56 **III. (£2.)**—Miss Annie B. Walker, The Farm, Icomb, Stow-on-the-Wold.
50 **IV. (£1.)**—Miss Frances M. Stubbs, Highfields, Stafford.
51 **R. N. & H. C.**—Miss Harriet Stubbs, Rickerscote, Stafford.
41 **H. C.**—Miss Ada Hopwood, Madeley Heath Farm, Newcastle, Staffs.
42 **H. C**—Miss Beatrice Fanny Horton, Naunton, Earls-Croome, Worcs.
59 **H. C.**—Miss Phoebe Wellsbury, Belbroughton Lodge, Stourbridge.
60 **H. C.**—Miss Fanny Wilbore, Wetley Rocks, Stoke-on-Trent.
39 **Com.**—Miss M. A. Evans, The Hill Farm, Weston, Ross, Herefordshire.
44 **Com.**—Miss Elizabeth Llewellyn, Rhewbina, Whitchurch, Cardiff.
45 **Com.**—Miss Julia Morris, Archenhill Farm, Bringstye, Worcester.
49 **Com.**—Miss Sarah S. Sparrow, Ellis's Farm, Hardwicke, Gloucestershire.
53 **Com.**—Miss Edith M. Smithin, Cleeve Prior, Evesham, Worcestershire.

Class 4.—*Prize-winners in Classes* 1, 2 *and* 3.[1] [12 competitors.]

52 **I. (£5.)**—Miss Jessie Stubbs, Highfields, Stafford.
50 **II. (£3.)**—Miss Frances M. Stubbs, Highfields, Stafford.
4 **III. (£2.)**—Miss Agnes Jones, Blaennant Farm, Pontardawe, Glam.
16 **IV. (£1.)**—Mrs. Mary Watts, Sheep Court, Bonvilston, Cardiff
41 **R. N. & H. C.**—Miss Emmie Woolfe, Hungerford House, Madeley, Staffs.
3 **H. C.**—Miss Janet James, Blaen Baglan Farm, Briton Ferry, Glam.
7 **H. C.**—Miss Jane Lougher, Sheep Court, Bonvilston, Cardiff.
15 **H. C.**—Miss Edith Biddle, The Laurels, St. Arvans, Chepstow, Mon.
16 **H. C.**—Miss Emily M. Cox, Pwllpen, Christchurch, Newport, Mon.
18 **H. C.**—Mrs. Quinton Dick, Panta Farm, Chepstow, Mon.
33 **H. C.**—Miss Edith Annie Pritchard, Coed Ithel Farm, Llandogo.
56 **H. C.**—Miss Annie B. Walker, The Farm, Icomb, Stow-on-the-Wold.

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[1] Prizes given by the Cardiff Local Committee.

HORSE-SHOEING COMPETITIONS.

(*Open to the United Kingdom.*)

Class 1.—*Hunters.* [39 entries, none absent.]

16 **I. (£4.)**—JOHN ISAAC,[1] R.S.S., Cambrian Forge, Carmarthen.
37 **II. (£3. 5s.)**—WILLIAM WELLAND, R.S.S., Berrow, Burnham, Bridgwater.
30 **III. (£2. 15s.)**—W. H. STANBURY, R.S.S., 5 Clarence Place, Stonehouse.
35 **IV. (£2. 10s.)**—ROBERT VIGAR, R.S.S., Townsend, Caterham, Surrey.
32 **V. (£2.)**—WILLIAM STEWARD, R.S.S., Rockingham Lane, Sheffield.
33 **VI. (£1. 10s.)**—SAMUEL THOMPSON, R.S.S., Cumberland Street, Luton.
39 **R. N. & V. H. C.**—PHILLIP L. WILLIAMS, R.S.S., 20 Morgan Street, Hafod, Pontypridd, Glamorgan.
18 **V. H. C.**—WM. D. LANE, R.S.S., Llanvetherine, Abergavenny, Mont.
27 **V. H. C.**—JAMES STANLEY SANDERS, 106 Terrace Road, Swansea.
6 **H. C.**—DAVID DAVIES, R.S.S., Peterwell Forge, Lampeter, Cardigan.
10 **H. C.**—JOSEPH DEIGHTON, Spofforth, Harrogate, Yorks.
11 **H. C.**—TOM DRING, R.S.S., 7 Redcliffe Avenue, Ashton-under-Lyne.
1 **Com.**—WM. ADAMS, R.S.S., 2 Hanover Terrace, Pokesdown, Bournemouth.
13 **Com.**—JAMES FLETCHER, R.S.S., Tetford, Horncastle, Lincs.
14 **Com.**—JAMES FRAYN, R.S.S., Druckham, Launceston, Cornwall.
25 **Com.**—JAMES RUCK, R.S.S., Norman House, Keynsham, Somerset.

Class 2.—*Cart Horses.* [54 entries, none absent.]

49 **I. (£3. 15s.)**—WILLIAM DAVIES,[1] R.S.S., Cwmgarw Road, Brynamman.
84 **II. (£3. 5s.)**—JOHN REES, R.S.S., 10 Chapel Bridge, Cwmcarn, Newport.
72 **III. (£2. 15s.)**—THOMAS BENJAMIN LEWIS, R.S.S., Cwrty-Plas Forge, Llangadock, Carmarthen.
66 **IV. (£2. 10s.)**—DAVID JONES, Tairderwen, Brecon.
82 **V. (£2. 5s.)**—EVAN PROSSER, R.S.S., Sennybridge, Brecon.
59 **VI. (£1. 10s.)**—JOHN HARRIES, R.S.S., Rhydodin, Llangunnor, Carmarthen.
67 **R. N. & V. H. C.**—JAMES JONES, Llyfanog Smithy, Llanarth, Cardigan.
83 **H. C.**—JOHN PUGSLEY, Jun., R.S.S., 10 Hereford Street, Newport, Mon.
85 **H. C.**—ARTHUR ROGERS, Wilca Bridge, Raglan, Mon.
52 **Com.**—SIDNEY EARDLEY, Blaina Road, Abertillery, Mon.
57 **Com.**—REES GRIFFITHS, New Bridge Terrace, Skewen, near Neath, Glam.
58 **Com.**—HENRY JAMES HANNEY, R.S.S., 10 Roberts Road, Cwmtillery, Mon.
64 **Com.**—DAVID JONES, R.S.S., Felingwm, Nantgaredig, Carmarthen.
69 **Com.**—WILLIAM JONES, 5 Nile Street, Cwmbran, near Newport, Mon.
71 **Com.**—JOHN LEWIS, Jun., Cwrty-Plas Forge, Llangadock, Carmarthenshire.
78 **Com.**—EVAN OWEN, R.S.S., 9 Club Houses, Glebeland St., Merthyr, Glam.
87 **Com.**—ARTHUR J. RUDGE, 7 St. Nicholas Street, Hereford.

TIMBERING AND ROPE-SPLICING COMPETITIONS.[2]

Class 1.—*Timbering Competition, open to Colliers only.*[2]

[5 entries, none absent.]

2 **I. (£4.)**—WILLIAM JONES, 1 Rose Cottages, Merthyr Vale, Glam. *Partner*—Edward Evans.
4 **II. (£2.)**—JOB THOMAS, 15 Hill Row, Pentwyn, Fochriw, Pontlottyn, Glam. *Partner*—John Lewis.
5 **III. (£1.)**—THOMAS THOMAS, 4 Howell's Terrace, Nantymoll, Glam. *Partner*—William Thomas.

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[1] Awarded the FREEDOM OF THE WORSHIPFUL COMPANY OF FARRIERS.
[2] Prizes given by the Cardiff Local Committee.

Class 2.—*Timbering Competition, open to Timbermen and Colliers.*[1] [15 entries, none absent.]

11 I. (£4.)—Richard Jones, 35 Glynfach Road, Porth, Glam. (*Timberman.*) *Partner*—Isaac Williams.

20 II. (£2.)—John S. Thomas, Lower New Houses, Lower Cwmtwrch, R.S.O., Glam. (*Timberman.*) *Partner*—Tom Roberts.

17 III. (£1.)—Daniel Rees, 64 Cilfynydd Road, Cilfynydd, Pontypridd, Glam. (*Collier.*) *Partner*—Evan Davies.

7 R. N. & H. C.—Thomas Duggan, 35 Rhondda Terrace, Ferndale, Glam. (*Collier.*) *Partner*—William Duggan.

Class 3.—*For the best Splice in Flattened Stranded Rope.*[1] (24 *ft.* *Splice.*) [6 entries, none absent.]

21 I. (£4. & Champion £1.)—*Leading Hand*—Edward Conley, 19 Newall Street, Abertillery, Mon. *Gang*—Thomas Berry; Aaron Lawrance; Frank Hillman.

24 II. (£2.)—*Leading Hand*—Francis Leighfield, 1 Gold Chain Cottages, Bedwas, Cardiff. *Gang*—John Morgan; Rufus Rideout; Maurice O'Connell.

23 III. (£1.)—*Leading Hand*—David Jones, 3 Middle Row, Cwm Pennar, Mountain Ash, Glam. *Gang*—William Treharne; Lld. P. Jones; Edward Wood.

Class 4.—*For the best Splice in Flattened Stranded Rope.*[1] (18 *ft.* *Splice.*) [5 entries, none absent.]

30 I. (£4.)—*Leading Hand*—George Thomas, 33 North Terrace, Mardy, Pontypridd, Glam. *Gang*—John Williams; Thomas Jones; Daniel Morgan.

27 II. (£2.)—*Leading Hand*—Thomas Prosser, Hope Cottage, New Tredegar, Mon. *Gang*—Thomas Evans; Owen Humphreys; David J. Prosser.

HORSE-JUMPING COMPETITIONS.[1]

(The Entry Fees received were divided equally among the Prize-winners in each class, in augmentation of the prizes.)

Class A.—*Animals exhibited in Classes 3, 4 and 5 of the Cardiff Prize Sheet, which are not to compete in Classes B and C.* [No entries.]

Class B.—*Mares or Geldings, 15 hands 2 inches and over.*[1] [13 entries.]

I. (£20.)—Mrs. Blockley, Moor Hall, Madeley, Staffs., for **Omega**, brown gelding.

II. (£15.)—Francis W. J. Firkins, Brockamin House, Leigh, Worcester, for **Artist**, bay gelding.

III. (£10.)—Walter W. Grundy, 30 Broad Street, Worcester, for **Stag**, grey gelding

R. N.—Charles Ansty Daniell, Church Farm, Atworth, near Melksham, for **Newcastle**, roan gelding.

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[1] Prizes given by the Cardiff Local Committee.

Class C.—*Mares or Geldings, above* 14 *hands* 2 *inches and under* 15 *hands* 2 *inches.*[1] [6 entries.]

I. (£20.)—Walter W. Grundy, 30 Broad Street, Worcester, for **Swallow**, black gelding.
II. (£15.)—Frederick Voller Grange, Oak House, Farndon, Cheshire, for **Hard Cash**, black gelding.
III. (£10.)—The Shamrock Stud, Holland House, Sutton Coldfield, Warwickshire, for **Comet**, bay gelding.
R. N. & H. C.—Mrs. Blockley, Moor Hall, Madeley, Staffs, for **Diana**, brown mare.

Class D.—*Pony Mares or Geldings,* 14 *hands* 2 *inches and under. (Open to animals exhibited in other Classes at the Cardiff Meeting.)* [1] [6 entries.]

I. (£20.)—Ben Sims, 1 Northwick Terr., Cheltenham, for **Fear Not**, black mare.
II. (£15.)—Frank Gerald Lyall, Melton Mowbray, for **Morris Dancer**, grey mare.
III. (£10.)—Captain Arthur Hamilton Jones, Holly Lodge, Croesycielog, near Pontypool, Mon., for **Pink 'Un**, pink gelding.
R. N.—William Thomas Weaver, Cross Ways Hotel, Dunkirton, Bath, for **Little Susie.**

Consolation Class.—*Unsuccessful Competitors in Classes B, C, and D.*[1] [9 entries.]

I. (£10.)—Charles A. Daniell, Church Farm, Atworth, near Melksham, for **Newcastle**, roan gelding, 17 hands.
II. (£5.)—William Henry Brain, Vaindre Hall, St. Mellons, Cardiff, for **Gipsy**, brown mare, 15 hands 2½ inches.
III. (£3.)—Mrs. Blockley, Moor Hall, Madeley, Staffs., for **Diana**, brown mare, 15 hands, 1 inch.
R. N.—William Henry Lowe, Holly Bank, Upton Park, Chester, for **Nailer.**

CARLISLE MEETING, July 5-11, 1902.

Closing Dates for Receipt of Entries and Entry Fees.

Implements, Saturday, March 15, 1902 (Post Entries, Tuesday, April 1).

Live Stock (Horses, Cattle, Sheep, Pigs):—
Tuesday, April 15, 1902, at 10*s.* per Entry.
Wednesday, April 30, at 15*s.* per Post Entry.
Thursday, May 15 (last day), at £1 per Late Entry.

Poultry and Farm Produce:—
Wednesday, April 30, at 2*s.* 6*d.* per Entry.
Thursday, May 15 (last day), at 5*s.* per Post Entry.

Double Fees throughout to Non-Members of the Society.

An Exhibitor will be permitted to make, in the Classes for Live Stock and Poultry, as many entries in a Class as there are Prizes offered in that Class.

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[1] Prizes given by the Cardiff Local Committee

PRIZE LIST
FOR
CARLISLE MEETING, JULY 7 to JULY 11, 1902.

Total value of Prizes offered (exclusive of Champion Prizes and Medals offered by Breed Societies), £6,069: of which amount £1,250 are contributed by the Carlisle Local Committee, and £313 by various Breed Societies.

CHAMPION PRIZES.

The following Champion Prizes are offered by the Carlisle Local Committee and various Breed Societies.

Hunters' Improvement Society . .	Gold Medal, value £10 10*s*., for the best Hunter Filly not exceeding 3 years old.
Hackney Horse Society . . .	Two Gold Medals for the best Hackney Stallion, and for the best Mare or Filly.
Polo Pony Society . . .	Silver Medal for the best Mountain and Moorland Pony.
Polo Pony Society	Silver Medal for the best Fell Pony.
Polo Pony Society	Two Gold Medals for the best Polo Pony Stallion, and for the best Mare.
Shire Horse Society	Two Gold Medals for the best Shire Stallion, and for the best Mare or Filly; and £5 each to the Breeders of the Champion Shire Stallion and Mare or Filly.
Carlisle Local Committee . . .	Two Champion Prizes of £20 each for the best Clydesdale Stallion and for the best Mare or Filly.
Carlisle Local Committee . . .	Cup or Piece of Plate of the value of £10 10*s*., for the best Agricultural Filly, and £10 for the best Colt or Gelding.
Shorthorn Society	Two Prizes of £20 each for the best Shorthorn Bull, and for the best Cow or Heifer.
Red Polled Cattle Society . . .	Two Prizes of £10 each for the best Red Polled Bull, and for the best Cow or Heifer.
Polled Cattle Society	Gold Medal for the best Aberdeen Angus Bull, Cow, or Heifer.
Galloway Cattle Society . . .	Two Cups value £10 10*s*. each, for the best Galloway Bull, and the best Cow or Heifer.
English Kerry and Dexter Cattle Society	Two Challenge Cups, value £26 5*s*. each, for the best Kerry Bull, Cow, or Heifer, and for the best Dexter Bull, Cow, or Heifer. The Cup to be the property of an Exhibitor winning it three years in succession.
Carlisle Local Committee . . .	Cup or Piece of Plate for the best Dairy Cow.
Carlisle Local Committee . . .	£10 for the best Bullock, or Heifer, in the Polled (Blue Grey) Cattle Classes.
Southdown Sheep Society . . .	Prize of £10 10*s*. for best Southdown Ram.
Suffolk Sheep Society . . .	Gold Medal for the best Suffolk Ram.
Lincoln Long-wool Sheep Breeders' Association.	Prize of £10 10*s*. for the best Lincoln Ram.
Carlisle Local Committee . . .	Cup or Piece of Plate for the best Pen of Cross-bred Sheep.
National Pig Breeders' Association .	Four Gold Medals, value £5 5*s*. each, for the best Boar or Sow of the Large White, Middle White, Small White, and Tamworth breeds.
British Berkshire Society . . .	Prize of £5 for the best Berkshire Boar or Sow.

HORSES (£1,868).

HUNTERS.

	Prizes		
	1st	2nd	3rd
	£	£	£
Mare, with foal at foot (15 st. and upwards)	20	10	5
Mare, with foal at foot (12 to 15 st.)	20	10	5
Mare or Gelding (up to 15 st.), foaled before or in 1897[1]	25	10	5
Mare or Gelding (up to 12 st.), foaled before or in 1897[1]	20	10	5
Mare, foaled in 1898[1]	15	10	5
Gelding, foaled in 1898[1]	15	10	5
Filly, foaled in 1899	15	10	5
Gelding, foaled in 1899[1]	15	10	5
Filly, foaled in 1900	15	10	5
Gelding, foaled in 1900[1]	15	10	5
Filly, foaled in 1901	10	5	–
Colt or Gelding, foaled in 1901[1]	10	5	3

RIDING COBS.

	1st	2nd	3rd
Mare or Gelding, above 14 hands 2 ins. and not over 15 hands 1 in., up to 14 stones, foaled before or in 1897[1]	15	10	5
Mare or Gelding, above 14, and not over 14 hands 2 in., up to 12 stones, foaled before or in 1897[1]	15	10	5

CLEVELAND BAYS AND COACH HORSES.

	1st	2nd	3rd
Stallion, foaled in 1899	15	10	5
Stallion, foaled in 1900	15	10	5
Mare (with foal at foot)	15	10	5

HACKNEYS.

	1st	2nd	3rd
Stallion, foaled in 1899, 15 hds. 1 in. and upwards	15	10	5
Stallion, foaled in 1898 or 1899, above 14 hands and under 15 hands 1 inch[1]	15	10	5
Stallion, foaled in 1900	15	10	5
Stallion, foaled in 1901	15	10	5
Mare (with foal at foot), 15 hands and upwards	15	10	5
Filly, foaled in 1899	15	10	5
Filly, foaled in 1900	15	10	5

PONIES.

	1st	2nd	3rd
Stallion, not over 14 hds.	15	10	5
Mare (with foal at foot), not over 14 hands	15	10	5
Mare or Gelding, not over 13 hands 2 ins., foaled before or in 1898[1]	10	5	3

SHETLAND PONIES.

	1st	2nd	3rd
Stallion, not exceeding 10½ hands, foaled before or in 1899[3]	5	3	2
Mare, not exceeding 10½ hands, foaled before or in 1899[3]	5	3	2

MOUNTAIN AND MOORLAND PONIES.

	Prizes		
	1st	2nd	3rd
	£	£	£
Stallion, foaled before or in 1899, not over 13 h. 2 in.	10	5	-
Mare, foaled before or in 1899, not over 13 h. 2 in.	10	5	-

FELL PONIES.

	1st	2nd	3rd
Stallion, of any age, not over 13 hds. 2 in.[1]	10	5	3
Mare, foaled before or in '98, not over 13 hds. 2 in.[1]	10	5	3
Filly, foaled in 1899 or 1900, not over 13 hands 2 inches[1]	10	5	3

POLO PONIES.

	1st	2nd	3rd
Stallion, not exceeding 14 hands 2 inches[1]	15	10	5
Stallion (Eastern Sire) not over 14 hands 2 inches[2]	10	7	3
Mare, above 13-2 and not over 14-2 hds., with foal at foot, or to foal in 1902[2]	10	7	3
Mare, not over 13-2 hands, with foal at foot, or to foal in 1902[2]	10	7	3
Gelding, or Filly, foaled in 1899, not over 14 h. 1 in.[2]	7	4	2
Colt, Gelding, or Filly, foaled in 1900, not over 14 hands[2]	7	4	2
Colt, Gelding, or Filly, foaled in 1901[2]	7	4	2

HARNESS HORSES AND PONIES.

To be driven in Single Harness.

	1st	2nd	3rd
Mare or Gelding, any age, above 15 hands[1]	15	10	5
Mare or Gelding, any age, above 14 and not over 15 hands[1]	15	10	5
Pony Mare or Gelding, any age, not over 14 h.[1]	10	5	3

SHIRE.

	1st	2nd	3rd
Stallion, foaled in 1899	15	10	5
Stallion, foaled in 1900	15	10	5
Stallion, foaled in 1901	15	10	5
Mare (with foal at foot)	15	10	5
Filly, foaled in 1899	15	10	5
Filly, foaled in 1900	15	10	5
Filly, foaled in 1901	15	10	5

CLYDESDALE.

Same as for Shire.

SUFFOLK.

	1st	2nd	3rd
Stallion, foaled in 1899	15	10	5
Stallion, foaled in 1900	15	10	5
Mare (with foal at foot)	15	10	5
Filly, foaled in 1899	15	10	5

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[1] Offered by the Carlisle Local Committee.

[2] Offered by the Polo Pony Society.

[3] Offered by the Shetland Pony Stud-Book Society.

AGRICULTURAL.

	Prizes 1st £	2nd £	3rd £
Gelding, foaled in 1899[1]	15	10	5
Filly, foaled in 1899[1]	15	10	5
Gelding, foaled in 1900[1]	15	10	5
Filly, foaled in 1900[1]	15	10	5
Colt or Gelding, foaled in 1901[1]	10	5	3
Filly, foaled in 1901[1]	10	5	3

DRAUGHT HORSES

To be exhibited on Thursday, July 10.
Entries close May 15. *Entry Fees—Members*, 2s. 6d. *Non-Members*, 5s.

	1st £	2nd £	3rd £
Pair of Agricultural Mares or Geldings, foaled before or in 1898, not less than 16 hands[1]	20	10	5
Agricultural Gelding, foaled in 1898, not less than 16 hands[1]	15	10	5

CATTLE (£1,805).

SHORTHORN.

	1st £	2nd £	3rd £
Bull, calved in '98 or '99	15	10	5
Bull, calved in 1900	15	10	5
Bull, calved in 1901	15	10	5
Cow, in-milk, calved in '96, '97, or '98	15	10	5
Heifer, in-milk, calved in 1899	15	10	5
Heifer, calved in 1900	15	10	5
Heifer, calved in 1901	15	10	5

LINCOLNSHIRE RED SHORT-HORN.

	1st £	2nd £	3rd £
Bull, calved in '98, '99, or 1900[2]	15	10	–
Bull, calved in 1901[2]	10	5	–
Cow, in-milk, calved in '96, '97, 98, or '99[2]	15	10	–
Heifer, calved in 1900 or 1901[2]	10	5	–

HEREFORD.

	1st £	2nd £	3rd £
Bull, calved in '98 or '99	15	10	5
Bull, calved in 1900	15	10	5
Bull, calved in 1901	15	10	5
Cow, in-milk, calved in '96, '97, or '98	10	5	–
Heifer, in-milk, calved in 1899	10	5	–
Heifer, calved in 1900	15	10	5
Heifer, calved in 1901	15	10	5

DEVON.

	1st £	2nd £	3rd £
Bull, calved in 1898, 1899, or 1900	15	10	5
Bull, calved in 1901	15	10	5
Cow or Heifer, in-milk, calved in '96, '97, '98, or '99	15	10	5
Heifer, calved in 1900 or 1901	10	5	–

SUSSEX.

Same as for Devon.

WELSH.

Same as for Devon.

RED POLLED.

Same as for Devon.

ABERDEEN ANGUS.

	Prizes 1st £	2nd £	3rd £
Bull, calved in 1898, 1899, or 1900	15	10	5
Bull, calved in 1901	15	10	5
Cow or Heifer, in-milk, calved in '96, '97, '98, or '99	15	10	5
Heifer, calved in 1900	10	5	–
Heifer, calved in 1901	10	5	–

GALLOWAY.

Same as for Aberdeen Angus.

HIGHLAND.

	1st £	2nd £	3rd £
Bull, any age	15	10	5
Cow or Heifer, in-milk	15	10	5

AYRSHIRE.

	1st £	2nd £	3rd £
Bull, of any age	15	10	5
Cow or Heifer, in-milk, calved in 1896, 1897, 1898, or 1899	15	10	5
Heifer, calved in 1900 or 1901	10	5	–

JERSEY.

	1st £	2nd £	3rd £
Bull, calved in 1898, 1899, or 1900	10	5	–
Bull, calved in 1901	15	10	5
Cow, in-milk, calved in 1896, 1897, 1898, or 1899	15	10	5
Heifer, in milk, calved in 1900	15	10	5
Heifer, calved in 1901	15	10	5

GUERNSEY.

	1st £	2nd £	3rd £
Bull, calved in 1898, 1899, or 1900	10	5	–
Bull, calved in 1901	15	10	5
Cow or Heifer, in-milk, calved in '96, '97, '98, or '99	15	10	5
Heifer, calved in 1900	10	5	–
Heifer, calved in 1901	10	5	–

KERRY.

	1st £	2nd £	3rd £
Bull, calved in 1898, 1899, 1900, or 1901	10	5	3[5]
Cow or Heifer, in-milk, calved in 1896, 1897, 1898, or 1899	10	5	3[5]
Heifer, calved in 1900 or 1901[5]	10	5	3

DEXTER.

Same as for Kerry[5]

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[1] Offered by the Carlisle Local Committee.

[2] Offered by the Lincolnshire Red Short-horn Association.

[5] Third Prizes in each Class, and all Prizes in Heifer Classes for Kerries and Dexters, offered by the English Kerry and Dexter Cattle Society.

DAIRY COWS.

	Prizes 1st £	2nd £	3rd £
Shorthorn, Pedigree or Non-Pedigree, Dairy Cow, in-milk[1]	15	10	5
Cross-bred Dairy Cow, in-milk, cross to be stated[1]	15	10	5

PEDIGREE OR NON-PEDIGREE WHITE SHORTHORN BULLS

(For crossing with Galloways and Polled Angus).

	1st £	2nd £	3rd £
Bull, calved in 1900[1] .	15	10	5
Bull, calved in 1901[1] .	15	10	5

POLLED (BLUE GREY) CATTLE.

1st cross Shorthorn and Galloway (For feeding purposes).

	1st £	2nd £	3rd £
Bullock, with not more than four broad teeth[1] .	10	5	3
Bullock, with not more than two broad teeth[1] .	10	5	3
Heifer, with not more than four broad teeth[1] .	10	5	3
Heifer, with not more than two broad teeth[1] .	10	5	3

SHEEP (£1,287).

OXFORD DOWN.

	1st £	2nd £	3rd £
Two-Shear Ram . .	10	5	–
Shearling Ram . .	15	10	5
Three Ram Lambs, dropped in 1902 . .	10	5	3[2]
Three Shearling Ewes	15	10	5
Three Ewe Lambs, dropped in 1902 . .	10	5	3[2]

SHROPSHIRE.

	1st £	2nd £	3rd £
Two-Shear Ram . .	10	5	–
Shearling Ram . .	15	10	5
Five Shearling Rams[3]	15	10	5
Three Ram Lambs, dropped in 1902 . .	10	5	–
Three Shearling Ewes	15	10	5
Three Ewe Lambs, dropped in 1902 . .	10	5	–

SOUTHDOWN.

	1st £	2nd £	3rd £
Two-Shear Ram . .	10	5	–
Shearling Ram . .	15	10	5
Three Ram Lambs, dropped in 1902 . .	10	5	–
Three Shearling Ewes	15	10	5
Three Ewe Lambs, dropped in 1902 . .	10	5	–

HAMPSHIRE DOWN.

Same as for Southdown.

SUFFOLK.

Same as for Southdown.

LINCOLN.

	1st £	2nd £	3rd £
Two-Shear Ram . .	10	5	–
Shearling Ram . .	15	10	5
Five Shearling Rams[4]	15	10	5
Three Ram Lambs, dropped in 1902 . .	10	5	–
Three Shearling Ewes	15	10	5
Three Ewe Lambs, dropped in 1902 . .	10	5	–

LEICESTER.

	1st £	2nd £	3rd £
Shearling Ram . .	15	10	5
Three Ram Lambs, dropped in 1902 . .	10	5	–
Three Shearling Ewes	15	10	5
Three Ewe Lambs, dropped in 1902 . .	10	5	–

COTSWOLD.

Same as for Leicester.

BORDER LEICESTER.

Same as for Leicester.

KENTISH OR ROMNEY MARSH.

	1st £	2nd £	3rd £
Shearling Ram . .	10	5	–
Three Shearling Ewes	10	5	–

WENSLEYDALE.

	1st £	2nd £	3rd £
Two-Shear Ram . .	10	5	–
Shearling Ram . .	10	5	–
Three Shearling Ewes	10	5	–

CHEVIOT.

	1st £	2nd £	3rd £
Ram, Two-Shear and upwards	10	5	–
Shearling Ram . .	10	5	–
Three Shearling Ewes	10	5	–

BLACK-FACED MOUNTAIN.

Same as for Cheviot.

LONK.

Same as for Cheviot.

HERDWICK.

Same as for Cheviot.

WELSH MOUNTAIN.

	1st £	2nd £	3rd £
Ram, Two Shear and upwards . . .	10	5	–
Three Shearling Ewes	10	5	–

CROSS-BRED SHEEP.

(Cross to be Black-faced Mountain or Herdwick Ewes, with Border Leicester or Wensleydale Rams.)

	1st £	2nd £	3rd £
Three Cross-bred Two Shear Ewes, cross to be stated[1] . . .	10	5	3
Three Cross-bred Gimmer Shearlings, cross to be stated[1] . .	10	5	3

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[1] Offered by the Carlisle Local Committee.

[2] Offered by the Oxford Down Sheep Breeders' Association.

[3] Offered by the Shropshire Sheep Breeders' Association.

[4] Offered by the Lincoln Long-wool Sheep Breeders' Association.

PIGS (£396).

	Prizes 1st £	2nd £	3rd £
Large White . .	For Prizes see below		
Middle White . .			
Small White . .			
Berkshire . . .			
Tamworth . . .			

In each of the above Breeds the following prizes will be given:

Boar, farrowed in 1900 or 1901	10	5	3
Boar Pig, farrowed in 1902 .	10	5	3
Breeding Sow, farrowed in 1898, 1899, 1900, or 1901	10	5	3
Three Sow Pigs, farrowed in 1902	10	5	3

LARGE BLACK.

Boar, farrowed in 1900 or 1901	10	5	3
Breeding Sow, farrowed in 1898, '99, '00, or 1901 .	10	5	3

POULTRY (£243 15s.)

Prizes are offered for the best Cock, Hen, Cockerel, and Pullet of the following Breeds:—

	s.	s.	s.
Game, Old English .	30	15	10
Game, Indian . .	30	15	10
Dorking, Coloured .	30	15	10
Dorking, Silver Grey	30	15	10
Dorking, White or Cuckoo . .	30	15	10
Brahma and Cochin .	30	15	10
Langshan . . .	30	15	10
Plymouth Rock .	30	15	10
Wyandotte, Silver Laced . . .	30	15	10
Wyandotte, Gold Laced . . .	30	15	10
Wyandotte, any other variety .	30	15	10
Orpington, Black .	30	15	10
Orpington, any other variety . . .	30	15	10
French . . .	30	15	10
Minorca . . .	30	15	10
Leghorn . . .	30	15	10
Andalusian . .	30	15	10
Hamburgh, Spangled	30	15	10
Hamburgh, Pencilled	30	15	10
Any other breed (except Bantams) .	30	15	10

TABLE FOWLS

(to be sent and exhibited alive).

Pair of Cross-bred Cockerels . . .	30	15	10
Pair of Cross-Bred Pullets . . .	30	15	10

POULTRY (*contd.*).

	Prizes 1st s.	2nd s.	3rd s
Aylesbury Drake . .	30	15	10
Aylesbury Duck . .	30	15	10
Aylesbury Young Drake .	30	15	10
Aylesbury Duckling . .	30	15	10
Rouen Drake . . .	30	15	10
Rouen Duck . . .	30	15	10
Pekin Drake . . .	30	15	10
Pekin Duck . . .	30	15	10
Any Breed (except Aylesbury) or Cross-breed, Pair of Ducklings . .	30	15	10
Gander, Embden . .	40	20	10
Goose, Embden . . .	40	20	10
Gander, Toulouse . .	40	20	10
Goose, Toulouse . .	40	20	10
Turkey Cock . . .	40	20	10
Turkey Hen . . .	40	20	10

PRODUCE (£239 10s.).

BUTTER.

Keg or other Package of Butter not less than 14 lb. and under 40 lb. in weight 1st 5*l.*, 2nd 3*l.*

Three Tins or Jars of Butter, suitable for export, each to contain not more than 1½ lb. 1st. 3*l.*, 2nd. 2*l.*, 3rd. 1*l.* (Entries in these Classes close April 15, 1902.)

Box of Twelve 2 lb. Rolls of Butter, not more than 1 per cent. salt. 1st 5*l.*, 2nd 3*l.*, 3rd 1*l.*

2 lb. Fresh Butter, slightly salted, made up in pounds	Four of 3*l.* each. Four of 2*l.* each. Four of 1*l.* each.
2 lb. Fresh Butter, slightly salted, made up in pounds, from milk drawn from Cows other than Channel Islands, or Cows crossed with Channel Islands breeds.	Four of 3*l.* each. Four of 2*l.* each. Four of 1*l.* each.

CHEESE

	1st £	2nd £	3rd £	4th £
Three Cheddar, of not less than 50 lb. each, made in 1902 .	8	5	3	1
Three Cheshire, of not less than 40 lb. each, made in 1902 .	8	5	3	1
Three Stilton, made in 1902 . . .	5	3	2	–
Three Wensleydale (Stilton shape), made in 1902 . .	5	3	2	–
Three Double Gloucester, made in 1902	5	3	2	–

CHEESE (*contd.*).

	Prizes 1st	2nd	3rd
	£	£	£
THREE WILTSHIRE (Loaf or Flat), not over 16 lb. each, made in 1902	5	3	2
THREE CHEESES, any other British, made in 1902 (Cream Cheese excepted)	5	3	2
THREE TINS OR JARS OF CHEESE, suitable for export, each to contain not more than 1½ lb.	3	2	1

(Entries in this Class close April 15, 1902.)

CIDER AND PERRY.

	1st	2nd	3rd
Cask of CIDER, made 1901	5	3	2
ONE Doz. CIDER, made 1901	5	3	2
ONE Doz. CIDER, made before 1901	5	3	2
ONE Doz. PERRY	5	3	2

HIVES, HONEY, AND BEE APPLIANCES.

(*Offered by British Bee-keepers' Association.*)

	1st	2nd	3rd
	s.	*s.*	*s.*
Collection of HIVES	80	40	20
OUTFIT FOR BEGINNER	20	15	10
OBSERVATORY HIVE (not more than 3 frames)	20	15	10
FRAME HIVE	20	15	10
Do. for Cottagers' use	20	15	10
HONEY EXTRACTOR	15	10	–
USEFUL APPLIANCES	10	–	–
12 Sections COMB HONEY (1902), about 12 lb.	15	10	5

HIVES, &c. (*contd.*)

	Prizes 1st	2nd	3rd
	s.	*s.*	*s*
12 Sections COMB HONEY (1901 or previous years), about 12 lb.	10	7/6	5
12 Sections COMB HEATHER HONEY of any year, about 12 lb.	10	7/6	5
3 Shallow Frames COMB HONEY, 1902	10	7/6	5
RUN OR EXTRACTED LIGHT COLOURED HONEY (1902), about 12 lb.	15	10	5
RUN OR EXTRACTED MEDIUM COLOURED HONEY (1902), about 12 lb.	15	10	5
RUN OR EXTRACTED DARK COLOURED HONEY (1902), about 12 lb.	15	10	5
RUN OR EXTRACTED HONEY (1901 or previous years)	10	7/6	5
RUN OR EXTRACTED HEATHER HONEY (1901), about 12 lb.	10	7/6	5
GRANULATED HONEY (1901 or previous), about 12 lb.	10	7/6	5
DISPLAY OF HONEY	30	20	10
3 lb. of WAX	10	7/6	5
3 lb. of WAX, in marketable form, for retail trade	10	7/6	5
HONEY VINEGAR ½ gall.	7/6	5	–
MEAD ½ gallon	7/6	5	–
OTHER PRACTICAL EXHIBITS	10	–	–
OTHER SCIENTIFIC EXHIBITS	10	–	–

HORSE-JUMPING COMPETITIONS (£160).[1]

	1st	2nd	3rd
	£	£	£
CLASS A.—Mares or Geldings, 15 hands 2 inches and over	20	15	10
CLASS B.—Mares or Geldings, above 14 hands 2 inches and under 15 hands 2 inches	20	15	10
CLASS C.—Pony Mares or Geldings, 14 hands 2 inches and under	20	10	5
CLASS D.—Consolation Class for animals which have not won a Prize in Classes A and B	10	5	3
CLASS E.—Consolation Class for animals which have not won a Prize in Class C	10	5	2

HORSE-SHOEING COMPETITIONS (£32).

(Open to the United Kingdom.)

CLASS I. HUNTERS (*Tuesday, July* 8). CLASS II. CART HORSES (*Thursday, July* 10).

PRIZES amounting to 16*l.* are offered in each class.

BUTTER-MAKING COMPETITIONS (£38).[1]

	1st	2nd	3rd	4th
	£	£	£	£
CLASS I.—Female members of a farmer's family resident in the County of Cumberland "The Blamire Prize"	4	3	2	1
CLASS II.—Dairymaids and others residing in Cumberland "The Blamire Prize"	4	3	2	1
CLASS III.—Dairymaids and others residing in the Counties of Cumberland, Durham, Northumberland, and Westmoreland (who have not been Prize-winners at previous Meetings of the Society)	5	3	2	1
CLASS IV.—Open only to the Prize-winners in Classes I., II., and III.	5	2	–	–

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[1] Offered by the Carlisle Local Committee.

NATIONAL AGRICULTURAL EXAMINATION BOARD

Appointed by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland.

PAPERS SET AT EXAMINATION FOR THE NATIONAL DIPLOMA IN THE SCIENCE AND PRACTICE OF AGRICULTURE,

HELD AT LEEDS, MAY 6 TO 8, 1901.

FIRST PART.

MENSURATION AND LAND SURVEYING.

MAXIMUM MARKS, 200. PASS MARKS FOR DIPLOMA, 120.

(*Time allowed, two hours.*)

Not more than Six of the following questions are to be answered. Nos. 4 and 5 must be attempted.

Candidates are required to show the calculations used to arrive at the answers.

1. Find the cost of cleaning out an irregularly shaped pond from the following facts :—

1st portion reduced to a parallelogram 18 yards by 9½ yards; depths 2 ft. 4½ in., 2 ft. 9½ in., 3 ft. 6 in., 1 ft. 4 in.

2nd portion reduced to a semicircle with 19 yards *diameter*; depths average 3 ft. 1 in.

Price out the cost at 10*d*. per cubic yard of mud removed.

2. Find the total amount of excavation and embankment required in making the following road. Width 30 ft.

1st length	216 ft.,	average cutting	3 ft. 4 in.
2nd „	180 ft.,	„ „	2 ft. 3 in.
3rd „	144 ft.,	„ embankment	2 ft. 9 in.
4th „	288 ft.,	„ „	2 ft. 6 in.

Assuming that the earth from the cutting is used for the embankment, state (1) amount of earth required to complete embankment, *or* (2) amount of surplus earth from cutting.

3. Ascertain the separate areas of Lots 1 to 6 in the plan of a field supplied.[1] Scale Ordnance $\frac{1}{2500}$.

Approximate total of field is 11 a. 0 r. 11 p.

4. From the field notes supplied,[1] plot the system of drainage recently carried out. Scale 1 chain to the inch.

Record the lengths of the check-lines A x, C x.

5. There are two errors in columns 4, 5, or 6 in the copy of a level book given you.[1] (*a*) Correct these errors; (*b*) balance the set of levels, and ascertain the error in the outdoor work with the given check levels.

6. *Sketch very neatly* (1) an imaginary longitudinal section of levels 7 in. long on paper, and (2) a cross-section (with a gradient of about 1 in 12) at a point near the centre of the longitudinal section.

Complete them in every particular in pencil, with assumed facts, so that the result (when inked) would be sufficiently good to send to a client.

The following features are to be shown :—

(*a*) A wall, (*b*) a hedge and ditch, (*c*) a brook, (*d*) an alteration of surface by a cutting, (*e*) the like for an embankment.

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[1] Not here reproduced.

7. Define (not describe) in careful language: "base line," "gradient," "datum," "north point," "contouring," "traversing."

8. Show the True Area of a field which on the Ordnance Map contains 7 a. 0 r. 0 p., when on visiting the Site you find the following facts:—

One side 740 links in length, boundary an ordinary highway.
Next side 770 „ „ „ a wall.
„ 1,050 „ „ „ a hedge with ditch on inside.
„ 780 „ „ „ parish boundary outside the hedge.

Note.—Sketch the field and assume any width for ditches.

9. (*a*) Show by a sketch how you would survey a quadrilateral field, using the *Theodolite* as much as possible and the *Chain* as little as necessary.
(*b*) Show by a sketch how you would find the distance of an inaccessible point with the aid of a Theodolite, and with assumed figures give the method of arriving at the result.
(*c*) What is the use of a Clinometer?

AGRICULTURAL BOTANY.

MAXIMUM MARKS, 200. PASS MARKS FOR DIPLOMA, 120.

(*Time allowed, two hours.*)

Not more than SIX of the following questions are to be answered. Nos. 2 and 8 must be attempted.

1. What is protoplasm? Where do plants get the elements of which the protoplasm is composed?

2. Trace the starch from its formation in the leaf to its storage in the grain of wheat.

3. Describe the conditions and methods of fertilisation in Angiosperms, Gymnosperms, and Ferns.

4. What are the outstanding characteristics of the flowers of the Buttercup, Canterbury Bell, Oak, and Dog's mercury (*Mercurialis perennis L.*)?

5. Give the life-history of Ergot.

6. What native British plants are carnivorous? What gain does the plant get from the captured animal?

7. Explain the conditions of successful grafting, the kind of stock suitable for the scion, and the mutual influence of stock and scion.

8. Specify the principal characters of the *Cruciferæ*. What plants of this Order are cultivated in Britain? What plants of the Order are injurious to the farmer?

9. What action, helpful or injurious, have bacteria on plants? Give examples.

GENERAL CHEMISTRY.

MAXIMUM MARKS, 100. PASS MARKS FOR DIPLOMA, 60.

(*Time allowed, two hours.*)

Not more than SIX of the following questions are to be answered. Nos. 8 and 9 must be attempted.

1. What is the action of aqueous potassic hydrate on aqueous solutions of the following: (*a*) zinc sulphate, (*b*) mercuric chloride, (*c*) methyl cyanide, (*d*) olive oil, (*e*) arsenious sulphide, (*f*) carbon disulphide?

2. How is nitric acid prepared? What is the action of nitric acid on (*a*) copper, (*b*) phosphorus, (*c*) red lead, (*d*) benzene, (*e*) alcohol?

3. What is the action of chlorine on (*a*) cold solution of sodic hydrate and (*b*) a hot solution of sodic hydrate? What is the action of sulphuric acid on the products so formed?

4. By what tests do you distinguish between (*a*) a nitrate and a nitrite, (*b*) a sulphate and a sulphite, and (*c*) a chlorate and a chloride?

5. Starting with common alcohol in each case, describe how you would prepare (1) common ether, (2) aldehyde, and (3) olefiant gas.

6. What is the action of heat on the following: (*a*) sodic carbonate, (*b*) ammonic bichromate, (*c*) potassic nitrate, (*d*) ammonic nitrite, and (*e*) ammonic nitrate?

7. What is the most common ore of lead? How is lead prepared from it? How is (*a*) white lead and (*b*) red lead prepared from lead?

8. You are given a solution of oxalic acid containing 63 grammes of the crystallised acid per litre. Twenty-three cubic centimeters of this acid exactly neutralises 15·5 c.c. of a solution of sodic hydrate. Calculate how much sodic hydrate there is in 100 c.c. of the solution.

$H = 1. \quad C = 12. \quad O = 16. \quad Na = 23.$

9. What is a soap? What is the composition of ordinary hard soap? What is the action on soap of (*a*) aqueous hydrochloric acid, (*b*) solution of calcic chloride?

GEOLOGY.

MAXIMUM MARKS, 100. PASS MARKS FOR DIPLOMA, 50.

(*Time allowed, two hours.*)

Not more than SIX of the following questions are to be answered, of which No. 9 must be one.

1. Describe the composition and characters of granite, and explain how granite may be reduced by natural processes into particles which give rise to deposits of sand and mud. How is limestone formed in nature?

2. Give an account of the geological structure of the following areas:—(i) The Scotch Highlands and Wales; (ii) Central England and the basins of the Forth and Clyde; (iii) South-Eastern England. Show that the geological structure has produced an effect upon the pursuits of the inhabitants of these areas.

3. What is meant by the term 'weathering' of rocks? Point out the main differences in the processes of weathering (i) in desert regions, (ii) in temperate regions of moderate rainfall.

4. Describe the geological conditions which are favourable (i) for natural springs, (ii) for the sinking of artesian wells. Illustrate your answer by diagrams.

5. Mention the principal localities in Britain which furnish (i) roofing-slates, (ii) phosphatic nodules, (iii) freestone. Describe the conditions under which the materials are found in each instance, and the age of the rocks in which they occur.

6. Give a general account of the mode of formation of soil from the rocks beneath it. Describe the characters of the soils derived from each of the following formations: (i) Highland schists, (ii) New Red Sandstone, (iii) chalk, (iv) boulder-clay.

7. Give an account of the mode of formation of the Fen District of Lincolnshire and Cambridgeshire, and account for the fertility of the Fenland soil.

8. Draw a rough geological map of a district containing a group of Silurian rocks folded into an anticline of which the axis runs north and south, and overlaid unconformably by a group of Carboniferous rocks dipping northward at a low angle. Name two characteristic Silurian fossils and two of Carboniferous age.

9. Describe *four* of the specimens submitted to you.

AGRICULTURAL ENTOMOLOGY.

MAXIMUM MARKS, 100. PASS MARKS FOR DIPLOMA, 50.

(Time allowed, two hours.)

Not more than SIX of the following questions are to be answered, of which either No. 8 or 9 must be one. The SIX questions attempted may, however, include both 8 and 9.

1. The sheep louse-fly (*Melophagus ovinus*) is often wrongly called the "sheep tick." Give four reasons showing that the term "tick" is inappropriate.
2. Describe the respiratory system of a typical insect. Why does a film of paraffin on a pool prove fatal to the mosquito larvæ in the water?
3. What are the differences between a caterpillar, a grub, and a maggot?
4. A familiar insect has two pairs of membranous wings with comparatively few nervures, those of each side united in flight, well-developed mandibles, the first abdominal segment intimately connected with the thorax, a complex mobile joint between the first and second abdominal segments, and a complete metamorphosis. Classify it, giving reasons for your decision.
5. Give an account of the external characteristics of the larvæ of the turnip saw-fly (*Athalia spinarum*), of any common weevil, of the diamond-back moth (*Plutella cruciferarum*, or *Tinea xylostella*), and of a gnat (*Culex*).
6. Describe the life-history of the sheep bot-fly (*Œstrus ovis*), *or* of the liver fluke (*Distomum hepaticum*).
7. Mention four insects useful in agriculture, and prove the case for each.
8. In a region infested with corn aphides, what would you do to diminish the pest?
9. State the case for and against the rook, the wood-pigeon, and the mole from an agricultural point of view.

SECOND PART.

PRACTICAL AGRICULTURE.

MAXIMUM MARKS, 500. PASS MARKS FOR DIPLOMA, 300.

(Time allowed, three hours.)

Not more than NINE of the following questions are to be answered. Nos. 1, 8 and 9 must be attempted.

1. Entering on a farm of 350 acres at Michaelmas, of which 100 acres are grass and the balance of 250 acres is farmed on a 5-course system, such as Wheat, Roots, Barley, Seeds, Seeds, state how you would proceed to stock the farm, what number of men and horses you would require; also, in as much detail as time will allow, how your men and horses would be engaged during the first month of your occupation.
2. Name the chief feeding breeds of cattle kept in Great Britain. State the characteristics that should be found in a good feeding animal of any breed. How would you treat such an animal during the first twelve months of its existence?
3. Give a sketch, with dimensions, of stackyard, just after harvest, on a farm where 200 acres of mixed corn are grown each year. Show the position of the stacks, specifying the variety of corn, with dimensions of same; also show how you would arrange for portable threshing-machine, &c.
4. Give details of the cultivation of the potato crop. How much seed is required to plant an acre? What manures are the most suitable, and what quantities should be applied, and what is a fair average crop on good land?
5. What breeds of cattle in the British Isles may be considered dairy

cattle? Give the characteristics of each breed, and the methods of dairy farming to which they are best adapted.

6. I have 20 acres of swedes of, say, 25 tons per acre. How should I secure them to have supplies available from December 1 to April 1? How many cattle and sheep should they keep for that period? How much per ton would you charge for these roots against your stock for feeding, and how much would you credit for manurial residue?

7. How could you use a weighbridge to advantage in the purchase and sale of live stock? What proportion of dead to live weight would you expect from well-fed cattle and sheep? Assuming that fat cattle are worth 35*s.* per cwt., and fat sheep 40*s.* per cwt., live weight, what prices could you afford to pay for lean stock in April and October?

8. Enumerate and describe the various kinds of purchased feeding-stuffs in general use, and state what you consider suitable rations for dairy stock, young cattle and feeding cattle, and sheep.

9. Assuming that you occupy a 200-acre dairy farm, three-fourths permanent pasture and one fourth tillage, where cheese-making is the chief source of income:—

(*a*) Prepare an inventory and valuation of the live stock and dairy utensils at Ladyday, 1901.

(*b*) Write a concise account of the more important events occurring upon the farm, of the work done, and of the receipts and expenditure, for each month of the year ending Ladyday, 1901.

(*c*) If all the milk were sold in fulfilment of a contract, how would the record differ from that which you have given?

10. Draw a rough plan of the buildings you consider necessary for the farm to which Question 9 refers, noting dimensions; and explain in detail the accommodation you would require for cheese-making.

11. Give a detailed account of the management of a flock of, say, 100 breeding ewes of one of the larger lowland breeds, upon an arable farm, from January 1, 1901, to May 1, 1901, having regard to the character of the weather during that time. Compare the management of a mountain flock with that of the lowland flock concerning which you have written.

12. State what you know about the application of lime to soils of different kinds and under various circumstances; estimate in detail the cost per acre; explain the effect of liming upon the physical condition of soils and upon the activity of soil bacteria; and state what effects you would expect liming to have upon the principal farm crops and upon pastures.

AGRICULTURAL BOOK-KEEPING.

MAXIMUM MARKS, 200. PASS MARKS FOR DIPLOMA, 120.

(*Time allowed, two hours.*)

1. The following is a Statement of Assets and Liabilities of A. Brown, Farmer, at Michaelmas (September 29), 1899.

Assets:—

	£	*s.*	*d.*
Stock:—			
Cattle	500	0	0
Horses	280	0	0
Sheep	300	0	0
Pigs	40	0	0
Corn and Hay in Stack	800	0	0
Implements	290	0	0
Feeding Stuffs	44	0	0
Manure	20	0	0
Sundry Debtors:—			
A. Thomson, Cattle Dealer	70	0	0
A. Bell, Corn Merchant	300	0	0

Liabilities:—

	£	s.	d.
Sundry Creditors:—			
Due A. White, Seed Merchant	100	0	0
T. Ure, Implement Maker	200	0	0
R. Davidson, amount of Loan	1,000	0	0
„ Bank, amount of Overdraft	430	0	0
Due to landlord, year's rent payable at Lady Day (March 25, 1899)	300	0	0
Outstanding a/c, Rent accrued for half-year to date	150	0	0
Bill payable, drawn on Mr. Brown by D. Wilson on August 16, at 3 months	150	0	0

Mr. James Wood was taken into partnership at Michaelmas, 1899, contributing 1,000*l.*, which was lodged in the Farm Bank Account. Partners to share profits equally after allowing interest at 5 per cent. on amount of Capital at beginning of period.

Open Ledger Accounts, including partners' Capital Accounts, showing balances at beginning of period. Write up the year's transactions from the following list, and prepare Profit and Loss Account and Balance Sheet as at September 29, 1900. All payments being made by cheque and all receipts banked, no Cash Account or Cash Book need be kept, a Bank Account being shown in the Ledger.

The following were the transactions during the year:—

Cheques were drawn for the following:—

	£	s.	d.
Wages	500	0	0
To meet Bill payable	150	0	0
Rent for two years to March 25, 1900	600	0	0
Sundry Expenses	40	0	0
Feeding Stuffs	100	0	0
Manures	120	0	0
Pigs purchased	105	0	0
Horses purchased	90	0	0
Sheep purchased	100	0	0
Rates, Taxes, and Insurance	50	0	0
Interest on Loan and Overdraft	41	0	0

400*l.* worth of cattle is purchased from A. Jack, and he is paid 200*l.* to account by cheque.

	£	s.	d.	£	s.	d.
Received from A. Thompson and						
Paid into Bank	65	0	0			
Discount allowed	5	0	0			
				70	0	0
Received from Auctioneer and paid into Bank for cattle sold during year				800	0	0
Sold cattle to A. Johnson				250	0	0
Received price of horse sold, and paid into Bank				38	0	0
Sheep sold to T. Watt				150	0	0
Received from Auctioneer price of sheep and lambs sold, and paid into Bank				270	0	0
Grain sold to A. Bell				800	0	0
Received his cheque and paid into Bank				1,045	0	0
Discount allowed him				55	0	0
Price of Pigs sold in market, paid into Bank				200	0	0
Received and paid into Bank during year for milk and butter sold				55	0	0
Paid by cheque to A. White, Seed Merchant				45	0	0
Discount allowed by him				5	0	0
Implements purchased from T. Ure				85	0	0
Paid him to account by cheque				130	0	0
Discount allowed by him				5	0	0
Paid by cheque to R. Davidson to account of Loan				350	0	0

The following is a valuation of Stock at close of year:—

	£	s	d.
Cattle	550	0	0
Horses	300	0	0
Sheep	280	0	0
Pigs	45	0	0
Corn and Hay in Stack	900	0	0
Feeding Stuffs	47	0	0
Manure	20	0	0

A. Johnson has become bankrupt, and this debt is only worth 10*s*. in the £. Give effect to this in the Profit and Loss Account.

Make allowance for Rent accrued for half-year from Lady Day to Michaelmas, 1900.

Write off 20 per cent. depreciation on implements.

2. If you were asked to explain why capital is a liability, what explanation would you give?

AGRICULTURAL CHEMISTRY.

MAXIMUM MARKS, 200. PASS MARKS FOR DIPLOMA, 120.

(*Time allowed, two hours.*)

Not more than SIX of the following questions are to be answered. Nos. 1, 4, and 6 must be attempted.

1. State briefly what you know of the functions of various classes of micro-organisms which occur in the soil, and indicate how far these organisms may be useful or otherwise in agriculture.

2. How may the presence of carbonate of lime in a soil influence your choice of the fertilisers you would use on it? What circumstances would tend to gradually reduce the proportion of lime in a soil? Give, if you can, an instance to show that actual exhaustion of lime can take place in an agricultural soil.

3. Explain the utility of *green-manuring*, pointing out the crops that may be used for this purpose, the times at which you would sow them and plough them in, and the classes of soil on which the system would be most usefully applied. Give reasons for the selection of certain plants rather than others for green-manuring purposes.

4. Describe the relative advantages and disadvantages of using farmyard manure in the fresh and in the well-rotted state respectively, and in reference to different classes of soil. Mention what you know of the losses which farmyard manure undergoes when kept in a heap, and of the means which have been devised for minimising these losses.

5. What are the principal proximate chemical constituents of barley (grain)? In what respects may the composition of the grain be affected by the influence of soil, manuring, and season?

6. What foods used on the farm supply, generally, the starches and sugars required in feeding? What purposes do these bodies (starches and sugars) fulfil, and what changes do they undergo in the processes of digestion?

7. What do you understand by the term "Fibre"? How is it estimated chemically? Give instances to show the variable digestibility of "fibre" according to the class of animal consuming it.

8. Mention the "preservatives" in common use for the following:—(*a*) wood, (*b*) fruit, (*c*) milk and dairy products. From what sources are these severally derived? State their method of action in each case, and give your opinion as to the reasonableness or otherwise of their use.

9. Give as full an account as you can of the various chemical changes which take place in the making and ripening of cheese, and of the influences by which these changes are brought about.

AGRICULTURAL ENGINEERING.

MAXIMUM MARKS, 200. PASS MARKS FOR DIPLOMA, 120.

(Time allowed, two hours).

Not more than SIX of the following questions are to be answered. Nos. 2, 5, and 6 must be attempted.

Where descriptions are asked for, careful drawings should be sent up with the answers.

1. Explain fully what is meant by saying that matter and energy are indestructible. State different forms in which energy may exist. What is the mechanical equivalent of heat, and how is it determined?

2. How is a mercurial barometer constructed? Explain the action of an aneroid. If a mercurial barometer stands at 30 inches, and a water barometer at 32 feet, compare the densities of mercury and water, and state what is the pressure of the air on a square inch.

3. A stream of water delivers 1,000 litres of water per second and has a fall of 10 metres. What horse-power should this give?

4. Describe any form of Grip Pulley. If the driving rope travelling 20 feet a second comes on the driving pulley with a tension of 50 lb., and leaves it with a tension of 5 lb., what is the horse-power it is giving out?

5. Describe fully, with details of construction, one at least of the following: a common plough, a cart wheel, a straw elevator, and a cream separator.

6. Give a description and sketch of a "locomotive" boiler, as usually fitted to ordinary portable engines, with internal arrangements and all fittings. If a new ordinary portable engine were placed in your charge, describe how you would proceed to get up steam and start to work, stating the special points you would attend to.

7. Describe the action of any form of refrigerating machine suitable for cold storage purposes. Give a diagram illustrative of the working of an Ammonia Compression machine.

8. What is meant by the "Coefficient of Friction"? The coefficient of friction at the axle of a cart is one-tenth of a sleigh on the road, and the diameter of the axle is one-thirtieth of the wheel; compare the work done in dragging the sleigh and the cart, the weights dragged being the same.

9. What is Ohm's Law? Describe the difference between a voltmeter and an ammeter? How by means of a compass could you tell if a wire was conveying a current and whether it was positive or negative? The side of a rectangle of wire is moved parallel towards and from a wire which is conveying a current; what effect is produced in the moving wire?

VETERINARY SCIENCE.

MAXIMUM MARKS, 100. PASS MARKS FOR DIPLOMA, 50.

(Time allowed, two hours.)

Not more than SIX of the following questions are to be answered. Nos. 2, 4, 6, and 9 must be attempted.

1. Describe the structure of the different kinds of muscular tissue and the functions of each form.

2. What kinds of fibrous tissue are there besides muscle? Describe their structure and uses.

3. Describe the anatomy and situation of the liver. What are its chief functions?

4. What is the arrangement of the mucous lining membrane in the stomach of the horse? What are the functions of the different portions?

5. In what portion of the intestinal canal is the function of absorption

most active? Is there any difference in structure in the mucous membrane in course of the canal?

6. When blood is drawn from a living animal and allowed to rest, what change takes place, and how may it be explained?

7. What is meant by telegony? What recent evidence is opposed to the theory?

8. Within what limits may the periods of gestation in the mare and cow vary under normal conditions?

9. What measures of a protective character should be adopted on a stock farm during the prevalence of a contagious or infectious disease?

PAPERS SET AT EXAMINATIONS HELD IN 1901 FOR THE NATIONAL DIPLOMA IN THE SCIENCE AND PRACTICE OF DAIRYING.

(A) PAPERS SET AT EXAMINATION (FOR ENGLISH STUDENTS) HELD AT READING, SEPTEMBER 23 TO 27, 1901.

GENERAL DAIRYING.

MAXIMUM NUMBER OF MARKS, 200. PASS NUMBER, 100.

(*Three hours allowed.*)

Candidates should attempt all the questions.

1. A field of first year's "seeds" is to be put through a rotation of crops with a view to laying it out to good permanent pasture. Assuming that the soil is a strong loam, naturally dry and of fair quality, state:—

   (*a*) The course of cropping you would recommend up to the time of sowing the grass;
   (*b*) The manures, if any, you would apply to each crop;
   (*c*) The kinds and quantities of grass and clover seeds you would sow per acre;
   (*d*) The approximate cost of one pound of each of the varieties of seed recommended;
   (*e*) The treatment you would recommend during the first three years.

2. What are the usual sources of gain and loss to the soil of a farm where the milk is separated, the cream made into butter, and the separated milk fed to calves and pigs?

3. State the internal dimensions of a house required for 20 cows of the shorthorn type. State also what materials you would recommend for the floor and for the stalls.

4. What crops would you grow for winter feeding, and how many acres of each would you consider profitable on a farm where the soil is a loam of fair quality, where the climate is good, where 50 cows are kept, and where part of the milk is used for butter-making and part sold in a neighbouring town, and where only heifer calves are reared?

5. What varieties and what number of poultry would you keep on a dairy farm of 100 acres in a district where there is a good demand for eggs of the best quality? What net returns would you expect from them in the year?

6. If you went to market to purchase a good dairy cow, describe the sort of animal you would seek out. State what questions you would ask the seller. What parts of the animal would you handle, and for what reasons?

7. State the kinds and quantities of food you would give during spring, summer, autumn, and winter, to a milch cow of the shorthorn type on a farm wholly under grass where the milk is made into cheese. Assume that the cow calves on March 1st.

8. Describe a good curing room for Cheddar cheese. State the dimensions of the shelves where each cheese weighs about 84 lb. What class of wood makes the best shelves for this purpose?

9. State the utensils required for a dairy of 50 cows where the milk is used for butter-making. State also the approximate cost of each utensil.

10. Describe the difficulties in making Cheddar cheese from milk that is too "ripe" before the rennet is added. How would you overcome or minimise these difficulties?

CHEESE-MAKING.

MAXIMUM NUMBER OF MARKS, 200. PASS NUMBER, 100.

(*Three hours allowed.*)

N.B.—Ten questions must be attempted.

1. How many cows giving full milk could you milk in an hour? How many milkers would you need for a dairy of 50 cows so as not to make the milking-time unduly protracted, and what would you consider a fair supply of milk to have from such a dairy, say, during the month of June?

2. Do you consider it necessary to have the milk for Cheddar cheese-making of a uniform acidity or ripeness, from day to day, before adding rennet?—and if so, give reasons, and how variations in ripeness at this stage would affect your work all through the process of making.

3. What is a favourable temperature for the development of bacteria in milk? Name a few kinds of bacteria more commonly found in milk, their origin, and method of increasing under favourable conditions.

4. To what do you attribute the bad flavours so often found in cheese? What treatment would you adopt in dealing with milk in a dairy where bad flavours were frequent, beginning with the evening's milk?

5. What is meant by the specific gravity of milk? Give that of water, milk, and cream, and what would you suspect in a sample of milk varying much from the standard you give?

6. Could you make cheese from separated milk? Wherein would the differences in treatment be, so as to make an article fairly palatable from this milk?

7. What are the proportions of fat, casein, and water you would expect to find in a sample of good Cheddar cheese? What temperature should the curing room be kept at? And the percentage of weight lost in curing of Cheddar cheese?

8. Recognising the possibility of the milk being contaminated in some form before reaching the dairy, what precautions would you use to prevent as far as possible such being the case?

9. What is meant by the terms pasteurising, sterilising, and refrigerating of milk? How are they accomplished, and of what benefit are they?

10. Describe fully the making of any one variety of pressed cheese other than Cheddar, and where variety you describe is mostly made.

11. Tell so far as you know the action rennet has on milk, and the effect of using too much or too little in cheese-making. What percentage of lactic acid should milk contain before you consider it ready for adding rennet for Cheddar cheese? What tests would you use to determine this?

12. Name a few of the more common class of soft cheeses made in this country. Describe the making of any one of them and treatment during curing.

CHEMISTRY AND BACTERIOLOGY.

MAXIMUM NUMBER OF MARKS, 200. PASS NUMBER, 100.

(SEVEN questions only to be answered, among which must be the five marked *—*i.e.* 2, 4, 7, 8, and 9.)

(Three hours allowed.)

1. In what main respects does *milk sugar* (lactose) differ from the sugars derived from the juices of plants? What changes does it undergo on treatment with acids, and on the decomposition of milk?

*2. What are the relative proportions in which the *casein* and *albumin* occur in cow's milk? In what direction will this proportion be found to vary in the case of (*a*) human milk, (*b*) goat's milk? Give the principal ways of distinguishing and of estimating the casein and albumin in cow's milk.

3. What circumstances may produce *abnormality* in the composition of the milk yielded by cows? In what way, as regards the several constituents, does such abnormality generally show itself?

*4. Set out the chief conditions which regulate the development of *micro-organisms* in milk; how may these serve generally to divide the micro-organisms into different classes?

5. In the case of a bulk of cow's milk going "bad," in what directions would you look to ascertain the cause; and how, chiefly, would you proceed to ascertain if the cause were due to one particular individual or to the herd generally?

6 What similarity is there between the action of rennet and that of certain digestive ferments found in the juices of the stomach?

*7. What is *butyric* fermentation; how is it produced, and how does it manifest itself in the case of (*a*) milk, (*b*) butter?

*8. Give your views as to the amount of *water* which butter should contain. What circumstances would induce a larger or smaller proportion of water than usual being present in butter?

*9. Mention the principal *cheese faults* that occur. From what causes may they arise? To what is due the poisonous qualities which cheese may occasionally possess?

(B) PAPERS SET AT EXAMINATION (FOR SCOTTISH STUDENTS) HELD AT KILMARNOCK, SEPTEMBER 30 TO OCTOBER 4, 1901.

GENERAL DAIRYING.

MAXIMUM NUMBER OF MARKS, 200. PASS NUMBER, 100.

(Three hours allowed.)

Candidates should attempt all the questions.

1. If it was found desirable to convert a tillage field into a good permanent meadow, state—

(*a*) The class of soil you would prefer for the purpose;
(*b*) The crop with which the grass seeds should be sown;
(*c*) The kinds and quantities of grass seeds per acre;
(*d*) How the mixture of seeds would differ from one suitable for permanent pasture;
(*e*) The treatment of the meadow during the first two years;

(*f*) Why during this period is such a field usually much greener in the month of April than an older meadow?

2. Draw a plan of a dairy suited for Cheddar cheese-making on a farm where sixty Ayrshire cows are kept, noting the dimensions of the rooms required.

3. Describe how, on a farm where the milk is made into cheese, you would feed a calf from birth until it is twelve months old. Assuming that the calf is of the shorthorn type, and is born on April 1, what probable weight would it be when four and when twelve months old respectively?

4. Arrange in the order of the percentage of (*a*) albuminoids, (*b*) fats, and (*c*) carbohydrates which they contain, the following foods—viz., oats, bran, decorticated cotton cake, ryegrass hay, and grass.

5. State (*a*) the cause, (*b*) the symptoms, (*c*) preventive measures, and (*d*) the cure of "husk" or "hoose" in calves.

6. State the advantages and disadvantages in making butter (*a*) on the creamery system, and (*b*) on the home dairying system.

7. What quantity of whey per day would you give a pig four months old? What kinds and quantities of food would you give in addition? What would be the probable dead weight in imperial stones of a pig seven months old fed as you describe?

8. On a dairy farm where the milk is used for butter-making, state the main rules you would try to observe in the following processes: (*a*) milking, (*b*) separating, (*c*) cream ripening, (*d*) working and making up butter to be sold to private customers.

9. What are the characteristics of good butter? State what is known of the causes of the common defects.

10. Describe a boiler suitable for a dairy where up to 300 gallons of milk are daily made into Cheddar cheese during the height of the cheese-making season, and where the vat is heated by steam. Make a sketch illustrating a vertical section of such a boiler as you describe. How much coal would it consume per week in summer? Assume that steam is used only for heating the contents of the vat and the water required to wash the ordinary utensils employed in a cheese dairy.

CHEESE-MAKING.

MAXIMUM NUMBER OF MARKS, 200. PASS NUMBER, 100.

(*Three hours allowed.*)

N.B.—Ten questions must be attempted.

1. In Cheddar cheese-making name and explain two of the best known tests for determining the amount of acid present in curd before drawing off the whey. Is it necessary to always develop the same amount of acid at this stage, and under what conditions would you vary it?

2. As a practical cheese- and butter-maker, state when, and why, you would wish to obtain control of your milk for cheese- and butter-making, where the cows are under your own management.

3. Give a clear, concise description of the making of Stilton cheese, treatment in curing-room, also the qualities and appearance expected in a prime ripe Stilton, which makes the best so much sought after.

4. What is your opinion of the milk standard recently fixed by Government? Give sound reasons for your opinions so far as your personal experience goes.

5. Given five hundred gallons of milk containing 3·5 per cent. of butter-fat, how much butter would it produce? And suppose this butter to fetch 1*s*. 2*d*. per lb., how many pounds of curd for Cheddar cheese would you need

to make, and how much per pound for the ripe cheese, to be equivalent in value, from a like quantity and quality of milk?

6. Name the principal constituents and proportions of each in normal cows' milk, those retained in cheese- and butter-making, and the proportion of those which passes off in the whey or buttermilk.

7. How many acres of pasture on well-farmed land in the south-west of Scotland should it take to feed well a dairy of seventy cows during the grazing season? What auxiliary feeding, and in what quantities, would you give it, in the event of pastures becoming scarce owing to drought?

8. What is meant by a porous curd? You are asked to go to a dairy to investigate the origin of this defect: state what causes you would suspect, and the means you would employ for detecting them.

9. Give a sketch of a cheese-press you consider right for pressing Cheddar cheese, the weight you would apply the first night after making, and to what pressure you would increase to finish off cheese with.

10. What means would you take to determine the amount of acid present in curd before adding the salt? Name the defects you would expect to find in a cheese made too sweet, and also in one too acid.

11. What difference would you make in the manufacture of Dunlop cheese as compared with Cheddar? How would you allocate one hundred points in judging coloured Cheddars, and the same in Dunlops?

12. You, as a dairy teacher, are given a class of raw students to instruct in dairying. Mention a few of the more important points you would impress upon them at starting practical work for themselves.

CHEMISTRY AND BACTERIOLOGY.

MAXIMUM NUMBER OF MARKS, 200. PASS NUMBER, 100.

(*Three hours allowed.*)

1. Define an acid and an alkali.

2. Give examples of a monobasic, a dibasic, and a tribasic acid, and write the formula of a calcium salt of each.

3. Given a quantity of common salt, how would you prepare from it some hydrochloric acid and some chlorine?

4. What is meant by a disinfectant? Sulphurous acid, lime, and permanganate of potash are used as disinfectants. State in what circumstances you would use each of these, and how you would use it.

5. What causes souring of milk, and how can souring be either delayed or entirely prevented? How would you estimate the amount of sourness in milk?

6. What is meant by an albuminoid substance? Mention three different albuminoids, and explain how they differ.

7. Give approximately the average composition of sweet milk, skim milk, separated milk, cream and butter.

8. To what is the ripening of cheese due? What is the function performed by salt in the ripening of cheese?

9. State approximately the composition of turnips and oat straw. What are their deficiencies as fodder for milch cows? With what materials would you supplement these, and why?

10. State any experience you possess as regards the special effect produced on the quality of milk, butter or cheese, by the use of any special kind of fodder.

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INDEX TO VOLUME LXII.

1901.

The titles of Articles are printed in Italics. The Roman numerals refer to the Appendix.

ABORTION, *Epizootic or Contagious*, 96–112
— in Cattle, 96
— in Ewes, 111
— in Mares, 109
Accounts, Statements of Society's, xii
Acorn Gall-Wasp, 270
Agricultural Depression, 5, 33
Agriculture in the Reign of Queen Victoria, 1
Annual Chrysanthemum, 340
Annual Report for 1901 *of the Consulting Botanist*, 241–256
— *Consulting Chemist*, 229–240
— *for* 1900 *of the Principal of the Royal Veterinary College*, 215–228
— *for* 1901 *of the Zoologist*, 257–271
Anthrax, 215
Aphtha, Malignant, 222
Autumn of 1901, The, 400
Awards at Cardiff Meeting, cv

BACTERIOLOGICAL Evidence of Abortion, 102
Balance Sheet for 1900, xii, xlii
Barley, Continuous growing of, 279
— Kiln-drying of seed, 294
— Thick *v.* Thin Sowing of, 329
— Varieties of, 294
Basic Slag, 237
Beans, Disease of, 247
Bedford, Francis Duke of, 367–373
— Presentation of Bust of, lxxxi
Beetle-Mite on Lime Trees, 270
Bent Grass, Common, 255
Biscuit Chippings as food for stock, 236
Black-Currant Gall-Mite, 257
Blackpool, Invitation to hold Show at, xxxv
Board of Agriculture, 1802, Resolutions of, 368
Bone Manure, 237
Book-farming, Prejudices against, 17
Brome Grasses, 251
Butter at Cardiff Meeting, 151
Butter-making Competitions at Cardiff Meeting, 155

CAKES, Feeding, 229; xxv, xliii, lxxxvi
Cardiff Meeting, 1901, *The*, 113–157
Carlisle Meeting, 1902, xxxv, lxxix, lxxxii, lxxxviii, clxxvii, clxxviii

Carrot Fly, 268
Carruthers (W.), *Annual Report for* 1901 *of the Consulting Botanist*, 241–256
Cattle at Cardiff Meeting, 132
Cheese at Cardiff Meeting, 152
Chemist, Consulting, Reports of: 229; Feb. 6, xxv; March 6, xxx; April 3, xliii; Dec. 11, lxxxvi
Cherries, Diseases of, 246
Cherry Orchards, Leaf Disease of, 241; xxxi, xliv, lxiii
Christian, H.R.H. Prince, nominated President, liv; elected President, lvi
Cider at Cardiff Meeting, 153
Cider-making, Some Practical Hints on, 40–49
Clarke (Sir Ernest), *Francis Duke of Bedford*, 367–373
Clover Disease, 247
Clover Seed Weevil, 257, 266
Colouring Matters in Food, 365
Committees of Council, Standing, iii
Common-farm system, 2
Cotton Cakes, 231
Cotton Seed Meal, lxxxvi
Council, List of, i
Crops in Great Britain, Produce of, 375

DAIRY Farming, 35
Diamond Back Moth, The, 267
Diseases of Animals, 215; xxvi, xxxii, xlv, liii, lxiii, lxxvi, lxxxii, lxxxvii
— of Plants, 241
Druce (S. B. L.), *The Market Gardeners' Compensation Act*, 1895, 356–361

EARLY *Feeding of Mangels to Sheep; and Gorse as Food for Sheep*, 308–316
Education, Agricultural, 38, 58
Education of the Young Farmer, The, 58–66
English Agriculture in the Reign of Queen Victoria, 1–39
Epizootic or Contagious Abortion, 96–112
Ewing (Prof. J. A.), *The Trials of Ice-making Plant at Cardiff*, 180–190
— *The Trials of Oil Engines at Cardiff*, 158–179

Examination in Agriculture, Report on the, 342–346
— Papers, clxxxiv
Experiments in Weed Prevention, 334–341

FEEDING Experiments, 1901–2, lxxv, lxxxi
— Stuffs, 229
Fertilisers, 237
Finger-and-Toe in Turnips Experiment, 298
Foot-and-Mouth Disease, 218; xxvi, xxxi, xlv, lxiv, lxxxvii
Foot Rot, 222
Fowl Cholera, 227
Francis Duke of Bedford, 367–373
Frit Fly, 257, 267

GEOGRAPHICAL Distribution of Members, v
Gilbert, Sir J. H. (In Memoriam), 347–355
Gilchrist (D. A.), *The Education of the Young Farmer*, 58–66
Glanders, 217
Godfrey (Ernest H.), *The Cardiff Meeting*, 1901, 113–157
Gorse as food for sheep, 308
— Experiment, 298
Governors of the Society, List of, vii
— and Members since Establishment of Society, xx
Green-manuring Experiment, 290
Greenwood (H. J.) elected Auditor, lvii
Grenville (R. Neville), *Some Practical Hints on Cider-making*, 40–49
Grinling (Henry) retires from Auditorship, xciii

HALL (Charles P.), *Miscellaneous Implements exhibited at Cardiff*, 191–197
Hills Experiments, The, 317
Hives and Honey at Cardiff Meeting, 154
Honorary Members of the Society, List of, xi
Hop and its English Varieties, The, 67–95
Horn as a Manure, 238
Horse-jumping Competitions at Cardiff Meeting, 129
Horse-shoeing Competitions at Cardiff Meeting, 155
Horses, Agricultural, 13
— at Cardiff Meeting, 122

ICE-MAKING Plant at Cardiff Meeting, The Trials of, 180–190
Implements, Agricultural, 15, 23
— at Cardiff Meeting, 191
Insects injurious to Agriculture, 257

JOHNSON (A. H.) retires from Auditorship, lvii
Judges at Cardiff Meeting, ci

KILN-DRYING of Seed Barley, 204
King, His Majesty The, Address of Condolence with, xxi
— Letter from, on subject of Permanent Show Fund, lxvi
— Patron of Society, xxix, xxxiv
Koch (Dr.) and Tuberculosis, 53; lxxvii

LATHYRUS Sylvestris, 296
Leaf Disease of Cherries, 241
Library, Principal Additions to, cxcvii
Lime Trees, Insect infesting, 269, 270
Lincolnshire Red Short-horns, 134
Linseed Cake, 229
Lithium Chloride on Barley, Influence of, 324
— on Wheat, Influence of, 318
Live Stock in Great Britain, Numbers of, 377–379
Lucerne Experiment, 294

McFADYEAN (Prof.), *Annual Report for 1900 of the Principal of the Royal Veterinary College*, 215–228
— *Epizootic or Contagious Abortion*, 96–112
— *The Relationship between Human and Bovine Tuberculosis*, 50–57
Maize Germ, 236
Malignant Aphtha, 222
Mangels, Early feeding to Sheep of, 308
Manures, 23, 237
Market Gardeners' Compensation Act, 1895, 356–361
Mears *v.* Callender, 357
Members, Number of, since Establishment of Society, xx
Milk Regulations, xlvi, liv
Miscellaneous Implements exhibited at Cardiff, 191–197
Molasses as food for Bullocks, 301
Mycetozoan on turf, 248

OAK Trees, Acorn Gall-wasps on, 270
Oats, Wild, 336
Œstrus Disease in Sheep, 225
Officers of the Society, List of, iv
Oil Engines at Cardiff Meeting, 158
Onion, Wild, 336
"Orf" in Lambs, 223
Ormerod, Miss, The late, lxxvi

PARASITIC Gastritis, 224
Pasture Experiments, 297
Peach Tree, Mildew on, 247
Percival (Prof. John), *The Hop and its English Varieties*, 67–95
Perry at Cardiff Meeting, 153
Peruvian Guano, 238
Pigs at Cardiff Meeting, 148
Poppy, Wild, 334
Potato Disease Experiment, 298
Pot-Culture Experiments, The Woburn, 317–341
Poultry at Cardiff Meeting, 149

Preservatives and Colouring Matters in Food, 365–366
Prize Sheet for Carlisle Meeting, lxxxiii, lxxxviii, clxxviii
Proceedings of the Council in 1901: Feb. 6, xxi; March 6, xxix; April 3, xxxiv; May 1, xlviii; June 5, lxi; July 31, lxxi; Nov. 6, lxxx; Dec. 11, lxxxv
— at General Meetings in 1901: May 22, lvi; June 27, lxvii; Dec. 12, xci
Produce of Crops in Great Britain, 375
Prothero (R. E.), *English Agriculture in the Reign of Queen Victoria*, 1–39

RABIES, 224
Rainfall at Woburn, 1899, 1900, 299
— during 1900, 402, 403
Rating of Agricultural Land, The, 361–365
Refrigerating Plant at Cardiff Meeting, 180
Report to the National Agricultural Examination Board on the Results of the Second Examination for the National Diploma in Agriculture, 342–346
Reports of Council to General Meetings, May, 198; December, 208
Rice Meal, 285; xxx, xliv
Rope-splicing Competitions at Cardiff Meeting, 156
Rose Tree, Rust on, 248
Rotation Experiments, 286
Rothamsted Experiments, Sir Henry Gilbert and, 347
Rust on Rose Tree, 248
— on Wheat, 248

SAINFOIN Experiment, 296
Sheep at Cardiff Meeting, 144
Show, Permanent, xxxiii, xlvi, xlix, lxv, lxxiii, lxxxiv, xc, xcvi
Site Committee, lxxxiv, xc
Smith *v.* Callander, 356
Smut in Barley, 248
Sodium Iodide, Sodium Bromide, and Sodium Chloride, Soaking of Seed Wheat in solutions of, 326
— Soaking of Seed Barley in solutions of, 328
Spring of 1901, The, 396
Squarey (N. P.) elected Auditor, xciii
Statistics affecting British Agricultural Interests, 373–393
Summary of Members on Register, xi
Summer of 1901, The, 398
Sunshine during 1900, 402
Superphosphate, 237
Sutton (Martin J.), Letter on subject of Permanent Showyard, lxxiv
Swine Fever, 223; lxiv

TECHNICAL Education in Agriculture, 59
Temperature during 1900, 402
Tenant-right, 31
Timbering Competitions at Cardiff, 156
Tithe, Agitation against, 9
Trees, Insects destroying, 257, 268
Trials of Ice-making Plant at Cardiff, The, 180–190
— *of Portable Oil Engines at Cardiff, The*, 158–179
Tuberculosis, The Relationship between Human and Bovine, 50–57
Tuberculosis, xxviii, lxxvii
Tulip Bulbs, Disease of, 247
Turf, Mycetozoan on, 248
Turnips, Bacteria on, 248

VALUE of Condiments in the Feeding of Bullocks, 299
Veterinary College, Report of, 215
Victoria, Death of Her Majesty Queen, 198; xxi
— Her Majesty Queen, as a farmer, 19
— Portrait of. *Frontispiece*
Voelcker (Dr. J. A.), *Annual Report for 1901 of the Consulting Chem.*, 229–240
— *In Memoriam: Sir J. H. Gilbert*, 347–355
— *The Woburn Field and Feeding Experiments*, 272–316
— *The Woburn Pot-Culture Experiments*, 317–341

WARBURTON (Cecil), *Annual Report for 1901 of the Zoologist*, 257–271
Weather during the Agricultural Year 1900–1901, The, 394–404
Weed Prevention, Experiments in, 334–341
Weeds, 249
Wheat, Continuous growing of, 272
— Hard and Soft, 332
— Rust, 248
Willow Trees, Wood Wasps in, 270
Winter of 1900–1901, The, 394
Woburn Field and Feeding Experiments, The, 272–316
— *Pot-Culture Experiments, The*, 317–341
Wood Wasp, 270

YORK Meeting, 1900, Accounts of, xvi
Yorkshire Fog, Fungus on, 247
Young (Arthur) on Francis Duke of Bedford, 371

ZOOLOGIST, Reports of: 257; April 3, xlv; June 5, lxiii; July 31, lxxvi

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Royal Agricultural Society of England.

INCORPORATED BY ROYAL CHARTER, 26th MARCH, 1840.

STATEMENT
OF
PRIVILEGES OF MEMBERS
AND
LIST
OF THE SOCIETY'S
PUBLICATIONS

Offices of the Society:
13 HANOVER SQUARE, LONDON, W.
1901.

Royal Agricultural Society of England.

PATRON:

His Most Gracious Majesty The King.

SUBSCRIPTIONS.—1. *Annual.*—The subscription of a Governor is £5, and that of a Member £1, due in advance on the 1st of January of each year, and becoming in arrear if unpaid by the 1st of June.

2. *For Life.*—Governors may compound for their subscriptions for future years by paying at once the sum of £50, and Members by paying £15. After payment of ten or more annual subscriptions, a Member may compound for future subscriptions, including that of the current year, by a single payment of £10; and after payment of twenty or more annual subscriptions, by a single payment of £5—or £25 in the case of Governors.

ELECTION OF NEW MEMBERS.—Every candidate for admission into the Society must be proposed by a Member, who must specify in writing the full name, occupation, and usual place of residence of the candidate. Forms of proposal may be obtained on application to the Secretary; or the Form of Application on page XV may be used for the purpose. The Secretary will inform new Members of their election by letter.

PRIVILEGES OF MEMBERS:—

General Privileges, page III.
Chemical, pages IV to VI.
Veterinary, page VIII.
Botanical, page VII.
Zoological, page VIII.

The Society at present consists of 10,000 Members.

All communications as to Membership or on the general business of the Society should be addressed to the Secretary at 13, Hanover Square, W.

ERNEST CLARKE,
Secretary.

13 HANOVER SQUARE, W.
December, 1901.

Telegraphic Address: "PRACTICE, LONDON."

General Privileges of Governors and Members.

FREE ADMISSION TO SHOW-YARDS.

The Society holds every year an Exhibition of Live Stock, Farm Produce, and Implements, to which, and to the Grand Stands at the Horse Ring, Dairy, and elsewhere, Members are entitled to free admission.

REDUCED RATES FOR ENTRY OF LIVE STOCK AND IMPLEMENTS.

No entry fee is charged to Members exhibiting Implements at the Meetings. Firms and Companies may secure these privileges by the Membership of one or more of their partners. Entries of Horses, Cattle, Sheep, Pigs, Poultry, Produce, &c., can be made by Members at reduced rates.

FREE COPY OF SOCIETY'S JOURNAL.

Every Member is entitled to receive, without charge, a copy of the Journal of the Society, each Volume of which contains articles and communications by leading authorities on the most important agricultural questions of the day, together with official reports by the Society's Scientific Advisers and on the various departments of the Annual Shows, and other interesting features.

Copies of the Journal may be obtained by Non-Members of the Publisher, Mr. JOHN MURRAY, 50A, Albemarle Street, W., at the price of twelve shillings per copy.

LIBRARY AND READING ROOM.

The Society has a large and well-stocked library of standard books on agricultural subjects. A Reading Room is provided, at which the principal agricultural newspapers and other periodicals can be consulted by Members during office hours (10 a.m. to 4 p.m.).

CHEMICAL PRIVILEGES.

The Society makes annually a considerable grant from its general funds in order that Members may obtain at low rates analyses of feeding stuffs, artificial manures, soils, &c., by the Society's Consulting Chemist (Dr. J. AUGUSTUS VOELCKER, 13 Hanover Square, W.). Members may also consult Dr. VOELCKER either personally or by letter at a small fee.

VETERINARY PRIVILEGES.

Members can consult the Professors of the Royal Veterinary College at fixed rates of charge, and they have the privilege of sending Cattle, Sheep, and Pigs to the College Infirmary on the same terms as subscribers to the College.

BOTANICAL PRIVILEGES.

Reports can be obtained by Members from the Society's Consulting Botanist (Mr. W. CARRUTHERS, F.R.S., 44 Central Hill, Norwood, S.E.) on the purity of seeds, and on diseases or weeds affecting farm crops, at a fee of one shilling in each case.

ZOOLOGICAL PRIVILEGES.

Information respecting any animal (quadruped, bird, insect, worm, &c.) which, in any stage of its life, affects the farm or rural economy generally, with suggestions as to methods of prevention and remedy in respect to any such animal that may be injurious, can be obtained by Members from the Society's Zoologist (Mr. CECIL WARBURTON, M.A., The Zoological Laboratory, Cambridge) at a fee of one shilling for each case.

GENERAL MEETINGS OF MEMBERS.

Three General Meetings of Members take place annually: the Anniversary Meeting in London, on the 22nd May; a Meeting in the Society's Show-Yard in the summer; and a meeting in London in December—usually on the Thursday of the Smithfield Show week.

SPECIAL PRIVILEGES OF GOVERNORS.

In addition to the privileges of Members, as described above, Governors are entitled to an extra copy of each Volume of the Journal, to attend and speak at all meetings of the Council, and are alone eligible for election as President, Trustee, and Vice-President. The Annual Subscription of a Governor is £5, with a Life Composition of £50.

Governors' and Members' Privileges of Chemical Analysis.

(Applicable only to the case of Persons who are not commercially engaged in the manufacture or sale of any substance sent for Analysis.)

THE Council have fixed the following rates of Charges for Chemical Analysis to Members of the Society.

These privileges are applicable only when the Analyses are for *bonâ-fide* agricultural purposes, and are required by Members of the Society for their own use and guidance in respect of farms or land in their own occupation and within the United Kingdom.

The analyses are given on the understanding that they are required for the individual and sole benefit of the Member applying for them and must not be used for other persons, or for commercial purposes.

Land or estate agents, bailiffs, and others, when forwarding samples, are required to state the names of those members on whose behalf they apply.

Members of the Society also have the privilege of sending samples for analysis on behalf of any farming company of which they may be directors or managers, provided that the substances so sent shall be for use on the farm of the company, and not for sale to other persons.

Members are also allowed to send for analysis under these privileges any manures or feeding-stuffs to be used by their outgoing tenants, or which are to be given free of cost to their occupying tenants.

The analyses and reports may not be communicated to either vendor or manufacturer, except in cases of dispute.

Members are requested, when applying for an analysis, to quote the number in the subjoined schedule under which they wish it to be made.

The fees for analysis must be sent to the Consulting Chemist at the time of application.

No.		
1.	—An opinion of the purity of bone-dust or oil-cake (each sample)	2*s.* 6*d.*
2.	—An analysis of sulphate or muriate of ammonia, or of nitrate of soda, together with an opinion as to whether it be worth the price charged	5*s.*
3.	—An analysis of guano, showing the proportion of moisture, organic matter, sand, phosphate of lime, alkaline salts and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
4.	—An analysis of mineral superphosphate of lime for soluble phosphates only, together with an opinion as to whether it be worth the price charged	5*s.*
5.	—An analysis of superphosphate of lime, dissolved bones, &c., showing the proportions of moisture, organic matter, sand, soluble and insoluble phosphates, sulphate of lime, and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
6.	—An analysis of bone-dust, basic slag, or any other ordinary artificial manure, together with an opinion as to whether it be worth the price charged	10*s.*
7.	—An analysis of compound artificial manures, animal products, refuse substances used for manure, &c.	from 10*s.* to £1.
8.	—An analysis of limestone, showing the proportion of lime	7*s.* 6*d.*
9.	—An analysis of limestone, showing the proportion of lime and magnesia	10*s.*
10.	—An analysis of limestone or marls, showing the proportion of carbonate, phosphate, and sulphate of lime and magnesia, with sand and clay	10*s.*
11.	—Partial analysis of a soil, including determinations of clay, sand, organic matter, and carbonate of lime	10*s.*
12.	—Complete analysis of a soil	£3.
13.	—An analysis of oil-cake or other substance used for feeding purposes, showing the proportion of moisture, oil, mineral matter, albuminous matter, and woody fibre, as well as of starch, gum, and sugar in the aggregate; and an opinion of its feeding and fattening or milk-producing properties	10*s.*
14.	—Analysis of any vegetable product	10*s.*
15.	—Determination of the "hardness" of a sample of water before and after boiling	5*s.*
16.	—Analysis of water of land-drainage, and of water used for irrigation	£1.
17.	—Analysis of water used for domestic purposes	£1 10*s.*
18.	—An analysis of milk or cream (to assist Members in the management of their Dairies and Herds, *bonâ fide* for their own information and not for trade purposes, nor for use in connection with the Sale of Food and Drugs Acts)	5*s.*
19.	—Personal consultation with the Consulting Chemist. (To prevent disappointment it is suggested that Members desiring to hold a consultation with the Consulting Chemist should write to make an appointment)	5*s.*
20.	—Consultation by letter	5*s.*
21.	—Consultation necessitating the writing of three or more letters	10*s.*

Letters and samples (postage and carriage prepaid) should be addressed to the Consulting Chemist, Dr. J. AUGUSTUS VOELCKER, M.A., F.I.C., 13, Hanover Square, London, W. Cheques and Postal Orders should be crossed "London and Westminster Bank."

A pamphlet containing Suggestions as to the Purchase of Fertilisers and Feeding Stuffs, and Instructions for selecting and sending Samples for Analysis, will be sent to any Member on application to the Secretary, from whom also may be obtained Forms of Order for Fertilisers and Feeding Stuffs.

Instructions for Selecting and Sending Samples for Analysis.

GENERAL RULES.—(1.) A sample taken for analysis should be fairly *representative of the bulk* from which it has been drawn.—(2.) The sample should reach the Analyst *in the same condition* as it was at the time when drawn.

When **Fertilisers** are delivered in bags, select four or five of these from the bulk, and either turn them out on a floor and rapidly mix their contents, or else drive a shovel into each bag and draw out from as near the centre as possible a couple of shovelfuls of the manure, and mix these quickly on a floor.

Halve the heap obtained in either of these ways, take one half (rejecting the other) and mix again rapidly, flattening down with the shovel any lumps that appear. Repeat this operation until at last only some three or four pounds are left.

From this fill three tins, holding from ½ lb. to 1 lb. each, mark, fasten up and seal each of these. Send one for analysis, and retain the others for reference.

Or,—the manure may be put into glass bottles provided with well-fitting corks: the bottles should be labelled and the corks sealed down. The sample sent for analysis can be packed in a wooden box and sent by post or rail.

When manures are delivered in bulk, portions should be successively drawn from *different parts* of the bulk, the heap being turned over now and again. The portions drawn should be thoroughly mixed, subdivided, and, finally, samples should be taken as before, except that when the manure is coarse and bulky it is advisable to send larger samples than when it is in a finely divided condition.

Linseed, Cotton, and other Feeding Cakes.—If a single cake be taken, three strips should be broken off right across the cake and from the middle portion of it, one piece to be sent for analysis, and the other two retained for reference. Each of the three pieces should be marked, wrapped in paper, fastened up, and sealed. The piece forwarded for analysis can be sent by post or rail.

A more satisfactory plan is to select four to six cakes from different parts of the delivery, then break off a piece about four inches wide from the middle of each cake, and pass these pieces through a cake-breaker. The broken cake should then be well mixed and three samples of about 1 lb. each should be taken and kept in tins or bags duly marked, fastened and sealed as before. One of these lots should be sent for analysis, the remaining two being kept for reference. It is advisable also with the broken pieces to send a small strip from an unbroken cake.

Feeding Meals, Grain, &c.—Handfuls should be drawn from the centre of half a dozen different bags of the delivery; these lots should then be well mixed, and three ½-lb. tins or bags filled from the heap, each being marked, fastened up, and sealed. One sample is to be forwarded for analysis and the others retained for reference.

Soils.—Have a wooden box made 6 inches in length and width, and from 9 to 12 inches deep, according to the depth of soil and subsoil of the field. Mark out in the field a space of about 12 inches square; dig round in a slanting direction a trench, so as to leave undisturbed a block of soil and its subsoil 9 to 12 inches deep; trim this block to make it fit into the wooden box, invert the open box over it, press down firmly, then pass a spade under the box and lift it up, gently turn over the box, nail on the lid, and send by rail. The soil will then be received in the position in which it is found in the field.

In the case of very light, sandy, and porous soils, the wooden box may be at once inverted over the soil and forced down by pressure, and then dug out.

Waters.—Samples of water are best sent in glass-stoppered Winchester bottles, holding half a gallon. One such bottle is sufficient for a single sample. Care should be taken to have these scrupulously clean. In taking a sample of water for analysis it is advisable to reject the first portion drawn or pumped, so as to obtain a sample of the water when in ordinary flow. The bottle should be rinsed out with the water that is to be analysed, and it should be filled nearly to the top. The stopper should be secured with string, or be tied over with linen or soft leather. The sample can then be sent carefully packed either in a wooden box with sawdust, &c., or in a hamper with straw.

Milk.—A pint bottle should be sent in a wooden box.

GENERAL INSTRUCTIONS. Time for Taking Samples.—All samples, both of fertilisers and feeding stuffs, should be taken as soon after their delivery as possible, and should reach the Analyst within *ten days* after delivery of the article. In every case it is advisable that the Analyst's certificate be received before a fertiliser is sown or a feeding stuff is given to stock.

Procedure in the Event of the Vendor wishing Fresh Samples to be Drawn.—Should a purchaser find that the Analyst's certificate shows a fertiliser or feeding stuff not to come up to the guarantee given him, he may inform the vendor of the result and complain accordingly. He should then send to the vendor *one* of the two samples which he has kept for reference. If, however, the vendor should demand that a fresh sample be drawn, the purchaser must allow this, and also give the vendor an opportunity of being present, either in person or through a representative whom he may appoint. In that case three samples should be taken in the presence of both parties with the same precautions as before described, *each* of which should be duly packed up, labelled and *sealed* by both parties. One of these is to be given to the vendor, one is to be sent to the Analyst, and the third is to be kept by the purchaser for reference or future analysis if necessary.

Suggestions to Purchasers of Fertilisers and Feeding Stuffs.

Purchasers are recommended in all cases to insist on having an **INVOICE,** and to see that such invoice contains the following particulars:—

In the case of **Fertilisers**:—

(1) The *name* of the Fertiliser.

(2) Whether the Fertiliser is artificially *compounded* or not.

(3) The *minimum* analysis of the Fertiliser in respect of its principal fertilising ingredients.

In the case of artificially prepared **Feeding Stuffs** for Cattle:—

(1) The *name* of the article.

(2) The *description* of the article—whether it has been prepared (*a*) from one substance or seed, or (*b*) from more than one substance or seed.

For example:

(*a*) An invoice describing an article as "Linseed Cake" implies a warranty that the article is pure, *i.e.* is prepared from linseed only; "Cotton Cake" (whether decorticated or undecorticated), and "Rape Cake" (for feeding purposes), would come under a similar category.

Purchasers are reminded that the use of such terms as "95 per cent.," "Oil Cake," &c., affords no security against adulteration. The adoption of the ORDER FORM *issued by the Society is therefore strongly recommended.*

(*b*) In the case of a Compound Cake or Feeding Stuff, a vendor is only compelled by the Fertilisers and Feeding Stuffs Act of 1893 to state that it is prepared from more than one substance, and he is not required to specify the particular materials used in its preparation. Purchasers are recommended, therefore, to buy Mixed Feeding Cakes, Meals, &c., with a guaranteed analysis. Any statements in the invoice as to the component parts of such Mixed Cake or Meal will take effect as a warranty, as also will any statements in an invoice, circular, or advertisement as to the percentages of nutritive and other ingredients in any article sold for use as food for cattle.

Members of the Society are strongly recommended not only to see that the invoices given to them accurately describe the goods they have ordered, but to make all their orders *subject to the analysis and report of the Consulting Chemist of the Royal Agricultural Society of England.* Copies of a Form of Order for this purpose may be obtained on application to the Secretary.

Attention is particularly directed to the recommendations below as to the qualities of Fertilisers and Feeding Stuffs which purchasers should demand.

Conditions of Purchase and Sale.

FERTILISERS.

Raw Bones, Bone-meal, or Bone-dust to be guaranteed "PURE," and to contain not less than 45 per cent. of Phosphate of Lime, and not less than 4 per cent. of Ammonia.

Steamed or "Degelatinized" Bones to be guaranteed "PURE," and to contain not less than 55 per cent of Phosphate of Lime, and not less than 1 per cent. of Ammonia.

Mineral Superphosphate of Lime to be guaranteed to contain a certain percentage of "Soluble Phosphate" [From 25 to 28 per cent. of Soluble Phosphate is an ordinarily good quality.]

Dissolved Bones to be guaranteed to be "made from raw bone and acid only," and to be sold as containing stated minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia.

Compound Artificial Manures, Bone Manures, Bone Compounds, &c., to be sold by analysis stating the minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia contained.

Basic Slag to be guaranteed to be sufficiently finely ground that 80 to 90 per cent. passes through a sieve having 10,000 meshes to the square inch, and to contain a certain percentage of Phosphoric Acid or its equivalent in Phosphate of Lime. [The highest grades range from 17 to 20 per cent. of Phosphoric Acid; medium grades 14 to 16 per cent.; and low grades from 10 to 12 per cent. of Phosphoric Acid.]

Peruvian Guano to be described by that name, and to be sold by analysis stating the minimum percentages of Phosphates and Ammonia.

Sulphate of Ammonia to be guaranteed "PURE," and to contain not less than 24 per cent. of Ammonia.

Nitrate of Soda to be guaranteed "PURE," and to contain 95 per cent. Nitrate of Soda.

Kainit to be guaranteed to contain 23 per cent. of Sulphate of Potash.

All Fertilisers to be delivered in good and suitable condition for sowing.

FEEDING STUFFS.

Linseed Cake, Cotton Cake (Decorticated and Undecorticated), and **Rape Cake** (for feeding purposes) to be pure, *i.e.*, prepared *only* from the one kind of seed from which their name is derived; and to be in sound condition. The Report of the Consulting Chemist of the Royal Agricultural Society of England to be conclusive as to the "purity" or otherwise of any feeding stuffs.

Mixed Feeding Cakes, Meals, &c., to be sold on a guaranteed analysis, to be in sound condition, and to contain nothing of an injurious nature, nor ingredients that are worthless for feeding purposes.

Members' Botanical Privileges.

The Council have fixed the following rates of charge for the examination, by the Society's Consulting Botanist, of Plants and Seeds, for the *bonâ fide* and individual information and benefit of Members of the Society (not being seedsmen)

The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid.

1.	—A report on the purity, amount, and nature of foreign materials, the perfectness and germinating power of a sample of seed .	1*s*
2.	—Determination of the species of any weed or other plant, or of any epiphyte or vegetable parasite, with a report on its habits, and the means for its extermination or prevention	1*s*.
3.	—Report on any disease affecting farm crops	1*s*
4.	—Determination of the species of a collection of natural grasses found in any district, with a report on their habits and pasture value .	5*s*

N.B.—The Consulting Botanist's Reports on Seeds are furnished to enable Members,—purchasers of seeds and corn for agricultural or horticultural purposes,—to test the value of what they buy, and are not to be used or made available for advertising or trade purposes.

PURCHASE OF SEEDS.

The purchaser should obtain from the vendor, by invoice or otherwise, a proper designation of the seed he buys, with a guarantee that it contains not more than a specified amount of other seeds, and is free from ergot, or, in the case of clovers, from dodder and brome rape seeds, and of the percentage of seeds that will germinate.

Forms of "Order and Conditions of Purchase and Sale of Seeds" may be obtained by Members on application to the Secretary at 13, Hanover Square, London, W.

The Council strongly recommend that the purchase of prepared mixtures should be avoided, and that the different seeds to be sown should be purchased separately.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES.

I.—Seeds.

In sending seed or corn for examination the utmost care must be taken to secure a fair and honest sample. In the case of grass-seeds, the sample should be drawn from the centre of the sack or bag, and in all cases from the bulk delivered to the purchaser, and not from the purchased sample. When bought by sample the whole or part of that sample should be sent.

When it is considered necessary to secure legal evidence, the sample should be taken from the bulk and placed in a sealed bag in the presence of a reliable witness who is acquainted with the identity of the bulk, and care should be taken that the purchased sample and bulk be not tampered with after delivery, or mixed or brought in contact with any other sample or stock.

One ounce of grass and other small seeds should be sent, and two ounces of cereals or larger seeds. The exact name under which each sample has been bought should be sent with it.

Grass-seeds should be sent at least FOUR WEEKS, *and clover seed* TWO WEEKS *before they are required, and they should not be sown until the report has been received.*

II.—Plants.

In collecting specimens of plants, the whole plant should be taken up and the earth shaken from the roots. If possible, the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

Parcels or letters containing seeds or plants for examination (carriage or postage prepaid) must be addressed to Mr. W. CARRUTHERS, F.R.S., 44 Central Hill, Norwood, London, S.E.

Members' Veterinary Privileges.

I.—ADMISSION OF SICK OR DISEASED ANIMALS TO THE ROYAL VETERINARY COLLEGE.

1. Members of the Society have all the privileges of subscribers to the Royal Veterinary College, Camden Town, N.W., so far as the admission for treatment of Cattle, Sheep, and Swine is concerned, without being called upon to pay the annual subscription to the College of two guineas. The charges made by the College for keep and treatment are as follows:—Cattle, 10*s.* 6*d.*, and Sheep and Pigs, 3*s.* 6*d.* per week for each animal.

2. The full privileges of subscribers, including the examination of horses, and the admission of horses and dogs into the College Infirmary for surgical or medical treatment, on payment of the cost of keep, will be accorded to Members of the Society on payment of a subscription to the College of one guinea instead of two guineas per annum.

II.—FEES FOR CONSULTATIONS, ANALYSES, AND EXAMINATIONS AT THE ROYAL VETERINARY COLLEGE.

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Chemical Examination of viscera complete, for metals and alkaloids	2	0	0

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III.—INVESTIGATION OF OUTBREAKS OF DISEASE AMONG FARM STOCK.

1. In the event of an outbreak of disease among Cattle, Sheep, or Swine occurring on the farm of any Member of the Society, application should at once be made to the Principal of the Royal Veterinary College, Camden Town, London, N.W.

2. The Principal will then instruct an officer of the College to inquire into the outbreak and to report to him. He will also fix the amount of remuneration to be paid to the Inspector, whose professional fee will in no case exceed two guineas per day, exclusive of the actual cost of travelling and maintenance.

3. When it appears on the report of the Inspector selected that the outbreak was of an important character, or of general interest, the cost of the investigation will be defrayed by the Royal Veterinary College.

4. An annual grant is made by the Society to the Royal Veterinary College in aid of the further development of Cattle Pathology. In order to assist the authorities of the College in making the necessary investigations, Members of the Society are particularly requested to send to the College any diseased animals (cattle, sheep, or swine) which they would otherwise destroy as useless, and also any specimens of diseased parts of an unusual character. In the event of living animals being sent, it will be necessary to telegraph to the College at Camden Town the time of their arrival at a London station, so that a van may be sent to meet them. The expense of transit will be defrayed by the Royal Veterinary College.

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